

# hi-fi news

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## & Record Review

# VINYL SPEARHEAD

Exclusive: Thorens' radical entry-level turntable package

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**LOU REED**  
Transformer on 180g LP

**Six top  
Tonearms  
Tested**  
£500-£1500  
see p35

**'I bought  
John  
Crabbe's  
hi-fi!'**  
Feature p86



**Luxman amps**  
600-series pre/power

**Nola standmount  
Micro Grand speaker**



- **PLUS** 13 pages of music • **VINYL RE-RELEASE** Guns N' Roses' *Appetite for Destruction* on LP
- **AUDIO MILESTONES** Audio Research SP-6 pre • **INVESTIGATION** Pat Metheny's *Orchestrion*
- **MOVERS & SHAKERS** Jack Dinsdale • **HI-FI @ HOME** We re-visit John Crabbe's system 43yrs on!

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# MUSICAL FIDELITY

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## AMS50 Power Amplifier

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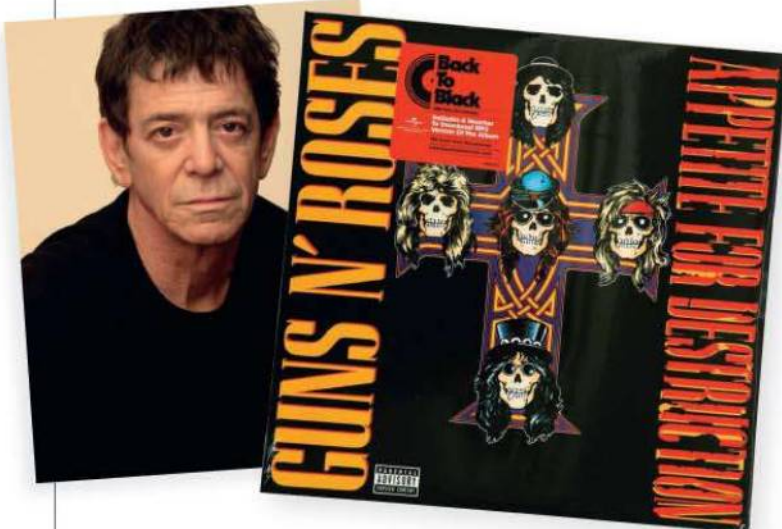




**ABOVE:** NAD goes digital with its flagship M2 Class D amplifier, p24



**ABOVE:** Cambridge makes universal CD/DVD/SACD/BD affordable, p46

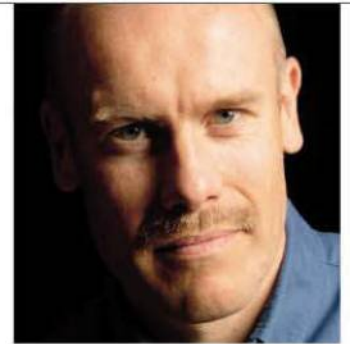


**VINYL:** Lou Reed's *Transformer* is our Vinyl Icon (p68) while Guns N' Roses' *Appetite for Destruction* is re-released as a 180g LP (p66)

**L**ike many audio enthusiasts 'of an age', I cut my teeth reading *Hi-Fi News & Record Review* when it was under the assured direction of John Crabbe. John edited our magazine from 1965 through to 1982, a period when hi-fi was dominated by DIY and new product reviews were in their infancy. My journey in our industry had just begun as JC retired and it remains a great regret that our paths never formally crossed in the intervening period before his passing in 2008.

Naturally, JC lives on with every issue of *Hi-Fi News* but his legacy also lives and breathes in the form of those fabulous floor-to-ceiling concrete horns built into his London home in the late 1960s. Instead of being pillaged by an unsympathetic property developer, JC's house was bought by fellow enthusiast David who both enjoys and lovingly maintains these behemoths, now joined by a pair of Quad ESL-63s and Voigt corner horns.

David was kind enough to invite us into his home and remind us what JC had achieved over 40 years ago. It was a sobering experience and one I'm delighted we can share with you in our very special Hi-Fi@Home feature, starting on p86.



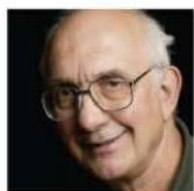
It's doubtful that many of us in the '60s and '70s could have imagined the look, feel and performance of cutting-edge hi-fi in 2010. That said, the minimalist appearance of NAD's M2 integrated amplifier is hardly radical even if the Class D technology within is evidently very special (see p24).

## John Crabbe's house and in-built horns were bought by an enthusiast'

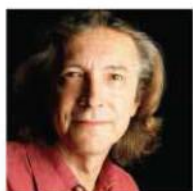
We are seeing increasing numbers of Class D amplifiers arrive at *Hi-Fi News Towers*, stretching from brands as diverse as Rotel to Audio Research and, now, to the champions of high power integrations, NAD. Precious few are genuinely *digital* Class D amps, however, so NAD joins an elite field with its heavyweight M2. For decades, Class D was the whipping boy of amplifier technology but now we are witnessing something of a revolution. Where will it all end?

**PAUL MILLER** EDITOR

### HI-FI NEWS' EXPERT LINE UP: THE FINEST MINDS IN AUDIO JOURNALISM BRING THEIR EXPERIENCE TO BEAR ON ALL AREAS OF HI-FI & MUSIC



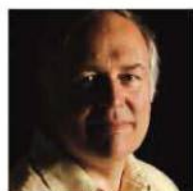
**BARRY FOX**  
Investigative journalist supreme, Barry is the first with news of the latest developments in hi-fi and music technologies



**JOHN BAMFORD**  
*HFN's* Features Editor has a penchant for massive speakers and hi-res audio. JB travels the globe for our On Location specials



**KEN KESSLER**  
is currently our Senior Contributing Editor and almost singularly responsible for the renaissance in valves and 'vintage hi-fi'



**KEITH HOWARD**  
has written about hi-fi for 30 years, and edited *Hi-Fi Answers* for nine. KH performs our speaker and headphone lab tests



**STEVE HARRIS**  
Former Editor of this very title from 1986 through to 2005. A lifetime in audio and a love of jazz makes Steve a goldmine



**JOHN HOWES**  
Foremost collector and archivist of vintage hi-fi, famous for the UK's bi-annual Audio Jumble, John shares his experience with *HFN*



**STEVE SUTHERLAND**  
Worked on *Melody Maker* and then edited *NME* from 1992-2000, the Britpop years. Steve brings a unique slant to our Vinyl Release pages

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*"The whole auditioning process took about 30 seconds. Play a piece of music on GII Mini Sub. Play it again on Aquarius and wonder why you were so attached to the GII Mini Sub." "Very highly recommended"*

HI-FI PLUS. ISSUE 68.



SIRIUS



ACCESSORIES



ORION



VISION



SIGMAS



TITAN

# CONTENTS

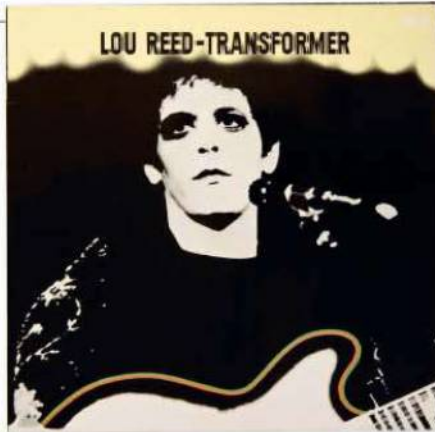
JUNE 10

## VINYL & RECORD REVIEWS

- 64 Vinyl Frontier**  
Paul Hawkins of Diverse Vinyl brings you the best of the new re-issues and re-releases on premium vinyl
- 68 Vinyl Release**  
From street gang to superstars... Ex-NME editor Steve Sutherland goes backstage with G N' R as their debut LP is released on 180g vinyl
- 70 Vinyl Icon**  
Released in December 1972, few LPs are as iconic as Lou Reed's *Transformer*. Chris Heard brings you the story behind the recording
- 75 Music Reviews**  
Our selection of audiophile LP and digital releases reviewed by our specialists alongside the latest rock, jazz and classical albums

## DEFINITIVE PRODUCT REVIEWS

- 20 Thorens TD 309**  
Thorens hits the entry-level market with a deck dressed to impress. A bold move, but will it pay off?
- 24 NAD M2**  
Some dozen years in development, NAD unveils the M2 integrated. Has digital amplification come of age?
- 30 Nola Micro Grand Ref.**  
'Costly, quirky, but so rewarding...' This UK-living room friendly ribbon standmount from Nola proves a hit
- 35 Group Test: Tonearms £500-£1500**  
Six arms from the biggest brands in the business of vinyl replay go head to head as we subject them to the very latest test technology
- 46 Cambridge Audio 650BD**  
A fully universal CD, SACD, DVD-A and DVD-compatible Blu-ray player all for £400. Too good to be true?
- 50 Luxman C-600/M-600**  
This pre/power combo combines



- 54 Naim CDX2/DAC**  
The Salisbury company delivers its first ever standalone DAC, and the promise of zero jitter...
- 58 Electrocompaniet AW400**  
From Norway comes this mighty monoblock, packing an almighty punch with headroom to spare

## VINTAGE

- 112 Vintage Review**  
How does the classic kit of yesteryear measure up today? This month it's the Armstrong 222 amplifier on test
- 116 Audio Milestones**  
It was the model that established ARC as a maker of sublime valve preamps. Ken Kessler celebrates the SP-6

## NEWS AND OPINION

- 06 News**  
JBL announces Project K2 S9900 speaker, new super density BD disc, valve amps from KTRLab, plus monitor your hi-fi's performance online!
- 10 Show Blog**  
From new decks to hard disks and plenty of vintage and exotica in between. We bring you the pick of the kit from the Park Inn Show 2010

- 14 Investigation**  
Instruments played by machines is not a new idea but virtuoso guitarist Pat Metheny has brought 2010 tech to the concept. We meet him...
- 92 Opinion**  
Insider comment on the hot audio topics of the day from Paul Miller, Barry Fox, Jim Lesurf, Steve Harris and, writing from the US, Barry Willis
- 101 Sound Off**  
Letters from our mailbox, including some big-bottle valve advice, a recipe for concrete speakers, and tweeter time alignment revisited
- 138 Off The Leash**  
Ken Kessler on today's 'gadget gurus' and why any one of you reading this is better qualified to write about high-end audio

## HI-FI PEOPLE

- 86 Hi-fi @ Home**  
We visit the music lover who bought his house from ex-Hi-Fi News editor John Crabbe, complete with JC's famous built-in bass horns...
- 108 Movers & Shakers**  
After inventing the world's first transformerless transistor amp, next came the 'perfect' turntable. We catch up with Prof Jack Dinsdale



**LEFT:** It can be used to upgrade the CDX2 and can be upgraded in its own right – Naim's first standalone DAC, p54



**ABOVE:** Tonearm group test, p35  
**BELOW:** Hi-fi @ Home – JC's system, p86



# New statement from JBL

'ROOM-FRIENDLY' K2 SPEAKER PROMISES PEAK PERFORMANCE – AT A PRICE



Introduced last year in America, but only now arriving on these shores, JBL's Project K2 S9900 is the latest 'statement' loudspeaker from the company's Synthesis special projects division, focused on cost-no-object, state-of-the-art designs. Featuring a 15in (380mm) bass driver whose massive motor unit includes an Alnico magnet, the K2 S9900 is designed to be a little more living room friendly than some of JBL's high-end Synthesis models, which are typically built into luxurious home theatres.

Priced at £28k the overall design incorporates key elements from previous K2 S9800/S9800SE and DD66000 (Everest) models. Mind you, despite its moderately compact dimensions of 1217x560x350mm (hwd) the K2 still weighs over 80kg.

To the rear of the ported cabinet are rotary switches allowing for the selection of bi-amplification, presence adjustment and high frequency level trim. A removable cover conceals a 9V battery used for capacitor bias in the dividing network. In upgrading the company's 'S9800 model, this new K2

S9900 increases its frequency response down to 33Hz via a new low-frequency extender while power handling has been increased substantially to 500W. Its horn-loaded 4in (100mm) compression driver – covering frequencies from around 20kHz all the way down to 700Hz – is a third larger than that used in the '9800 and is now made of a magnesium alloy in preference to beryllium. This is topped with a 1in (25mm) ultra high frequency 'super tweeter' to extend the frequency range to 50kHz featuring a beryllium driver with 50mm neodymium motor assembly.

The compression drivers employ a vented-gap cooling system where three air tunnels running from the pole piece to the magnet cover radiate the heat generated by the voice coil, while also controlling the back pressure. According to JBL, sensitivity of the new K2 is rated at 93dB.

Watch out for *HFN's* forthcoming exclusive review.

**CSE Custom, 01423 359054**  
[www.csecustom.com](http://www.csecustom.com)  
[www.jblsynthesis.com](http://www.jblsynthesis.com)

## Single-ended triode amps

SERBIAN BRAND HITS THE HIGH END WITH TUBE PRE/POWER

'Hot, huge and heavy' is how Alternative Audio describes its latest import – the Se2se monoblock 'single-ended zero feedback' triode amplifier from NAT Audio in Serbia. Weighing in at 34kgs and measuring 300x260x610mm (whd), each of these monoblocks employs two 211 new old-stock triodes manufactured in the 1940s and configured to deliver a rated 70W in Class A.

Partnering this behemoth is the NAT Audio Plasma R preamp, a dual

mono design again featuring valve rectification, little or no overall feedback and high current 6N30P-DR tubes driving the low impedance output.

Prices are £10,114 for a pair of the Se2se monoblock power amplifiers and £4592 for the matching Plasma R preamp.

**Alternative Audio, 01984 624242; [www.nataudio.com](http://www.nataudio.com)**



## All Brit horns with a twist

QURVE OFFERS BUYERS A CHOICE OF FULL-RANGE DRIVERS

Based in Battle, Qurve is a new manufacturer of single-driver horns. Its entry model e140 is a 540x225x290cm (hwd) standmount folded-horn employing Jordan's magnetically-shielded JX92S 140mm full-range driver. Then there are two floorstanders: the 89cm-tall e160 and 105cm-tall e200 that employ 160mm and 200mm drivers respectively. Unusually, for the floorstanders you can choose your preferred flavour of full-range driver. For the e160 there's a choice of Fostex's FE168E or FE166E units, while for the e200 model one can choose between the Fostex FE206En, Fostex FE208E or Lowther EX4. Prices start at £3500.

**Qurve Ltd, 01424 893311; [www.qurve.co.uk](http://www.qurve.co.uk)**



# KRTLab for UK

FRENCH HIGH-END VALVES AND SPEAKERS GAIN BRITISH DISTRIBUTOR



Reporting from the world's hi-fi shows during recent times we've spotted some handsome-looking valve amplifiers – and a clutch of loudspeakers, too – from French brand KRTLab.

An unfamiliar name to British audio enthusiasts perhaps, but the company's products are now becoming available here through a UK representative, Colin Sinclair, based in Southampton.

KRTLab was founded around five years ago by André Cochetoux, whose development of a pure valve circuit design, sold initially in France as amplifier kits, has steadily grown into a fully-fledged, family-run manufacturing business.

March this year saw KRTLab move into smart new headquarters (pictured below left) in the town of Nieppe, near Lille in northern France.

'Eliminating unnecessary electronic components and searching for the cleanest way of producing perfect sound demands painstaking research and development,' says the company whose portfolio of products includes several valve preamplifiers and amplifiers, a brace of Class D power amplifiers and 'purist' loudspeakers that employ single full range drivers and eschew signal-degrading crossovers.

KRTLab's entry level 'system' (you'll need a source) comprises its KTR5725

valve preamp with active Avant Scene Horn speakers (using 20W Class D power amplification from Flying Mole) and costs £2320.

The high-end pre/power eVolution 5725 preamp with eVolution 845 power amplifier (pictured top left) costs £8360.

Meanwhile the company boasts it holds an 'amazing' stock of vintage tubes, many dating back 50 years or more. Watch out for a new limited amplifier fitted with valves manufactured in 1940 that were designed for use in the first radar systems installed along Engand's south coast during WWII.

**KRTLab UK, 07770 968533**  
[www.ktr-lab.com](http://www.ktr-lab.com)

## Mains Monitoring

WEBSITE REVEALS THE STATE OF UK MAINS

Ever wondered what was going on with your electricity supply when the hi-fi system sounded under-par? Thanks to a new website from Dynamic Demand we can all check out the load on the National Grid, revealed as a fluctuation off the 50Hz mains frequency.

Dynamic Demand is an independent not-for-profit organisation established by a grant from the Esmée Fairbairn Foundation and maintained by charitable donations. The organisation is run by a group of renewable energy consultants, academics and environmental advocates.

Log on to the site and let us know if your system is off its mettle when the Grid is also under strain. And what about our turntables equipped with 50Hz synchronous motors – could this be wow and flutter from the National Grid? [www.dynamicdemand.co.uk:80/grid.htm](http://www.dynamicdemand.co.uk:80/grid.htm)



## HI-FI NEWS' NUGGETS

### BOOSTING BD AUDIO

Norwegian label 2L has employed msmstudios' mShuttle technology for its recent Pure Audio Blu-ray release of Ole Bull's *Violin Concertos*. This allows the music to be accessed and stored as WAV, MP3 or FLAC files via a PC network-connection. [www.2l.no](http://www.2l.no); [www.msm-studios.com](http://www.msm-studios.com); [www.pureaudio-bluray.com](http://www.pureaudio-bluray.com)

### D&M HOLDINGS

The parent company of Denon, Marantz, McIntosh and Boston Acoustics – D&M Holdings – has announced the closure of two other brands from its portfolio. Snell Acoustics and Escient are to go but it is expected that some of their key technologies will be 'leveraged by other D&M brands'. [www.dm-holdings.com](http://www.dm-holdings.com)

### MIGHTY KNIGHTS

Castle Acoustics has announced a five-strong speaker range, all with real-wood veneers and 'innovative bass loading'. Prices from £300-£1000. [www.castle.uk.com](http://www.castle.uk.com)

## Shanling's Fifty

NEW VALVE-BASED SYSTEM-IN-A-BOX



Pitched midway between Shanling's older MC-30 and MC-3000 'music centres', the new £1050 MC-50 offers the company's familiar combination of iPod dock, CD player, AM/FM tuner and amplifier in what has now become an almost iconic case style. The amplifier section is now slightly beefier with its valve preamp (two 6N3 triodes) augmented by a solid-state power amp rated at 2x15W/8ohm.

While the MC-50 will never raise the rafters with anything other than the most sensitive of speakers, it remains very flexible. This version includes a USB input plus preamp output and a combination of both S/PDIF digital and composite video outs, the latter extending the range of its iPod dock.

**Real Hi-Fi, 01257 473175**  
[www.realhi-fi.com](http://www.realhi-fi.com)

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## New digital Atlas

CONSUMER AND PRO-FORMAT DIGITAL CABLES LAUNCHED

The Atlas range of interconnect, speaker and video cables continues to expand with the launch of its new Mavros digital interconnects. Available terminated with either 75ohm 'non compressing' copper RCA plugs or 110ohm copper XLR plugs, the new cable will suit both S/PDIF and professional AES/EBU applications.

The standard S/PDIF version utilises 18x0.14mm silver-plated copper strands surrounded by an OFC braid and insulated with a superior 'microporous' Teflon dielectric. Both sets of cables are finished in a black cotton yarn jacket are priced at £185/1m.

**Atlas Cables, 0800 731 1140**  
**www.atlascables.com**



## Higher capacity Blu-ray

NEW BD-XL DISC ANNOUNCED BY BLU-RAY DISC ASSOCIATION

The Blu-ray Disc Association (BDA) has announced specs for a new higher-capacity format called BD-XL that more than doubles the amount of storage from current-generation Blu-ray discs. Also announced is a versatile new hybrid disc format called Intra-Hybrid (IH-BD), which allows read-only BD-ROM material to be placed on one 25GB layer while enabling recording on a second 25GB layer on the same disc.

Intended for professional applications, BD-XL provides storage of up to 128GB on write-once BD-Rs and 100GB on rewritable BD-RE media. The BD-XL system enables up to four recordable layers on a disc, compared with two layers currently available.

The first BD-XL discs are due out later this year. Consumer versions of BD-XL discs are expected to appear in markets such as Japan where Blu-ray disc recording of HDTV content is popular. Both new formats will require new hardware to read



and record material, although existing Blu-ray discs should be playable on any new products. In the case of the BD-XL format, the additional layers require more powerful laser pick-ups than those employed with current Blu-ray disc recorders.

However, because the new media specifications are extensions of current Blu-ray disc technology, future BD-XL and IH-BD devices can be designed to support existing 25GB and 50GB Blu-ray discs, says the BDA.

**www.bluraydisc.com**

## Better valve performance

HFN CAMPAIGN TO IMPROVE VALVE MATCHING BEARS FRUIT



Last month *Hi-Fi News & Record Review* kicked off its campaign to encourage manufacturers to improve the tolerance and matching of valves in their high-end tube products.

The lack of pair matching has resulted in a significant difference in performance (distortion rather than power output) between the left and right stereo channels of some branded tube pre and power

amplifiers and disc players.

Audio Emotion is the first to respond, offering matched sets Harma Diamond EL34 Retro pentodes in its Eastern Electric M520 integrated amplifier. These replace the standard EL34s fitted to EE's stock amplifiers. And the best news? There's no change in price from the standard £1995.

**Audio Emotion, 01333 425999**  
**www.audioemotion.co.uk**

## HI-FI NEWS? JUST ASK...

If you can't always find a copy of this magazine, help is at hand! Complete this form, hand it in at your local store and they'll arrange for a copy of each issue to be reserved for you. Some stores may even be able to arrange for it to be delivered to your home. **Just ask!**

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## Upcoming Events

IMPORTANT DATES FOR YOUR HI-FI DIARY

- 6-9 MAY** High End 2010, Munich, Germany  
[www.highendsociety.de](http://www.highendsociety.de)
- 20-23 MAY** Palm Expo 2010, China International Exhibition Centre, Beijing, China  
[www.eventful.com/beijing/events/palm-expo-2010](http://www.eventful.com/beijing/events/palm-expo-2010)
- 20 JUNE** Thames Valley Audio Fayre, Bracknell Leisure Centre  
01628 488727; [audiofayre@aol.com](mailto:audiofayre@aol.com)

# Park Inn Hi-Fi Show

Words and Pictures: Steve Harris



From modest beginnings, this spring Heathrow show has at least established itself in the calendar, even if it now seems like a curtain-raiser for the same organiser's autumn event at Whittlebury, Northants.

Among the 45 or so exhibitors were stalwart specialist builders like Audio Note, Revolver, Townshend and others, while retailers and retailer/distributors provided a rich variety of exotic products. There were LPs old and new to browse

from Diverse Vinyl and Stamford Audio, and new turntables like the under-£1000 Inspire Apollo. But hard-disk sources were in evidence too, with The Right Note demonstrating the new dCS Debussy DAC on 24/96 files from a Mac.

High-end importer Absolute Sounds was playing its 'entry-level' systems, that is, systems costing under £20k. And the hard-core enthusiasts who trotted along to the Park Inn certainly found some real surprises, whatever their budget.



Those *Alien* vertebrae are the clever cast aluminium segments which Barcelona-based ADN developed to build its elegant Innova speaker series. Making its first European show appearance at the Park Inn, ADN's novel construction is called Chamber Tech. Each uniform metal piece forms part of a double cabinet wall, the outer 'cavities' being fillable with sand. As seen here, the crossover sits neatly in one section and is said to be completely isolated from vibration. [www.adnacoustics.com](http://www.adnacoustics.com).



Angelsound's CD system (left) used a Raysonic CD168 tube player, Burson AB-160 buffer and Moscode 402 Au amp, plus a black Pure Power 1050 mains conditioner. On the vinyl side, its Rega-based arm seemingly attacked by some metal-eating insect, was the well-named Dr Feickert Woodpecker deck with Zyx Airy 3, Emillé Allure tube phono stage and Cha'am integrated. Speakers were Marten Miles 3 and solid-wood models by Acoustic Preference of Slovenia. [www.angelsoundaudio.com](http://www.angelsoundaudio.com).



Shown for the first time in the UK and making nice sounds through Focal speakers was a new French amplifier by StormAudio, seen here in a special red finish. There are two integrated amps, the 70W/channel Vertigo V35 and 170W V55, plus a 170W power amp-only version. [www.stormaudio.com](http://www.stormaudio.com).



A real eye-catcher was this combination of TAC C-80 player and Vincent SV-234 amp, with Raidho Ayra C1.0 speakers on their own dedicated stands. These slick Danish mini-monitors use a 115mm ceramic-cone bass/mid driver, reflex loaded by a rear port, matched to Raidho's own ribbon tweeter. [www.mv.audio.co.uk](http://www.mv.audio.co.uk), [www.duodistribution.co.uk](http://www.duodistribution.co.uk).



Aspara's HL1 horn speaker, reviewed last month, ran with Puresound CD player and amps. The vinyl source was Technics SP10, SME V and unusual copper-bodied Audio Note IO cartridge. [www.asparaacoustic.co.uk](http://www.asparaacoustic.co.uk).



Triangle had an awesome set-up in a huge room, using the biggest Emille valve amps to drive its flagship Grand Concert speakers. Also from the French maker's Magellan SW2 range is the Concerto, seen here as a cutaway. [www.triangle-fr.com](http://www.triangle-fr.com).



The Funk Firm's Arthur Khoubessarian showed his redesigned Saffire 2 turntable, with new power supply, rounded-edge platter and a slimmer version of the FXR arm tube. He's seen here with his answer to the Linn Keel, a subchassis for the LP12 he calls the Anchor. [www.thefunkfirm.co.uk](http://www.thefunkfirm.co.uk).



Tempting visitors with vintage gear were Nick Besley (right) of The Emporium mail order store and Hughie Day (left) who runs its branch in Kent. Behind Hughie are the Japanese Fal C90EX speakers, with square drivers. [www.emporiumhifi.com](http://www.emporiumhifi.com).



Valve amp specialist Art Audio showed off the new Conductor preamp, designed to do justice to its latest single-ended power amps, with a direct-coupled DC servo eliminating output capacitors. It's seen here with Vinyl 1 phono stage, Diavolo single-ended 300B stereo power amp and a pair of the mouthwatering Adagio monoblocks, each using two 520Bs, single-ended in parallel. CD source was a PS Audio transport and DAC while speakers were Ars Aures Mi from Italy. [www.artaudio.co.uk](http://www.artaudio.co.uk).



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atlascables.com

## SHOWBLOG First sight of new products & technology



Along with its Sapphire and Baby Fundamental speakers and hefty Zero Point cables, Audio Acoustics showed this 'radical world reference' power amplifier. Still in unbadged prototype form, this high-tech battery-powered unit is said to run for 30 days on a three-hour charge. [www.audioacoustics.co.uk](http://www.audioacoustics.co.uk).



From Woodstock Audio and ABC Audio came the Swiss-made Soullution 740 CD player, 720 preamp and, too big for the rack, 710 120W/channel power amp. On the right is the Hanss T-30 turntable, with three belts for each of its two motors. Below is the Hanss PA-60B phono stage. Speakers used were Gershman Acoustics Black Swan. [www.abc-audio.co.uk](http://www.abc-audio.co.uk).



Alium Audio showed a Consonance CD player, DAC and Cyber 2A3 monoblocks, but added its own novel open-baffle speaker. This uses a 10in paper-cone bass/mid with a Peerless silk-dome tweeter and comes as a £995 flat-pack kit, containing everything except the REL R205 subwoofers. [www.aliumaudio.com](http://www.aliumaudio.com).



For its EVO-1 speaker concept, Hart Audio in essence 'reverse engineered' a Tannoy Monitor Black, and now has its own parts manufactured to build complete speakers. You can add the optional bass cabinet, as seen here, with eight 4.5in rear-firing drivers powered by a panel amplifier mounted on the back of the main cabinet. This can also power a second bass box for each channel if desired. Prices start around £9150 per pair, with an extra charge for special finishes like Eucalyptus, Lacewood and the Burr veneer used for the speaker in the picture. [www.hartaudio.com](http://www.hartaudio.com).



Visitors could try their own iPod music in MSB's Signature Platinum DAC IV, seen here with Data CD IV and the cylindrical M202 monoblocks. Speakers were ADN's The Secret, seen 'exploded' two pages back. [www.msbtech.com](http://www.msbtech.com)

# Next month

Ken Kessler reports from  
The Paris Show

# Hand Played by Robots

Andy Rye talks to audiophile favourite Pat Metheny about his Orchestrion

As editor Paul Miller observed when describing his visit to the Museum Of Mechanical Instruments in Les Gets, France (see *HFN* Sept '09), mechanised instruments of the last century were the high-end audio of their day. Affordable only for the very rich, they were real instruments which were able to play music for their owners on demand.

Fast forward to 2010 and distinguished jazz guitarist Pat Metheny features another set of mechanical instruments in the form of a mechanical band he's commissioned especially for his new project, *Orchestrion* [Nonesuch CD 7559798473].

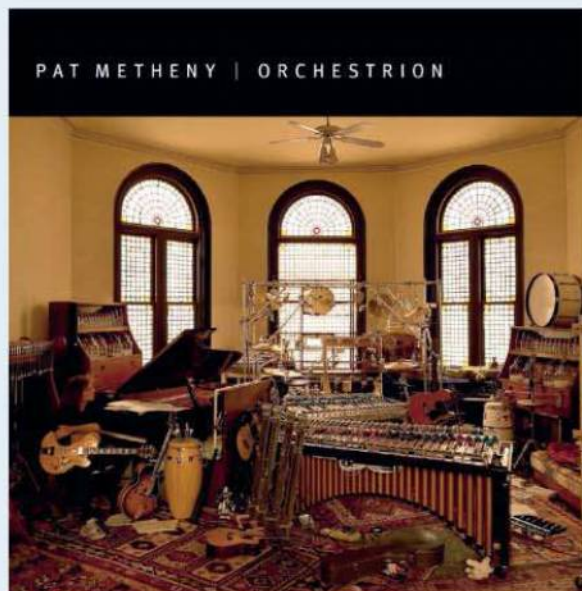
## A WEIRD IDEA...

After famously becoming the youngest ever teacher at the prestigious Berklee College Of Music – he was aged just 19 at the time – Metheny went on to build a reputation for stunning virtuoso guitar playing, strong melodic compositions and an imaginative exploration of different musical genres and band line-ups.

I talked with him about the Orchestration project, along with Eric Singer – one of the designers who played a leading role in developing and building the robot



**BELOW:** Available on CD now, the five-track *Orchestrion* set sees Pat Metheny improvise on guitar while controlling his robotic orchestra to play a pre-defined score



PAT METHENY | ORCHESTRION

band featured on the *Orchestrion* CD and used for Metheny's world tour, which runs between February and summer this year.

Metheny admits to having difficulty in explaining the project.

'I get how questions and why questions. The "hows" I'm happy to answer. The "whys" I'll keep between me and my shrink,' he says.

While the idea for the project was inspired by childhood memories of an antique player-piano in his grandfather's house in Wisconsin, which he recalls finding fascinating as a nine year old, the catalyst for the project was more recent.

'I reprised a Steve Reich piece "Electric Counterpoint" for Steve's 70th birthday concert. It's based on me playing 12 guitar parts on tape and the final part live. I realised, as it ended, that I was standing on stage at the Carnegie Hall and I had just played with a tape. And I thought "If

that's cool and the world is OK with that, then maybe now's the time to try this weird idea I've been carrying around since I was nine." The next day I pushed the go button.'

## NON-HUMAN LEAGUE

Eric Singer leads the group LEMUR (League of Experimental Musical Urban Robots) and is at the forefront of robotic instrument design. His group gives concerts, and he builds special robot instruments not just for bands but for gallery installations and private commissions.

I asked Eric about his contribution, beginning with what he actually provided.

'We created the body of the instrument and Pat augmented it with some other things he'd seen out there. We have half a dozen drums, toms, snares, a couple of bass drums, ten different cymbals, all the mallet instruments – that's

**BELOW:** Pat Metheny pictured with the vast range of robotic drums, vibraphones, marimbas and guitar bots that make up his Orchestrion. All the instruments can be triggered digitally from Metheny's guitar



vibraphone, marimba and orchestra bells – and two guitar bots, which are our own speciality instruments.'

The 'other things' mentioned by Eric include a Yamaha Disklavier concert grand piano, acoustic and bass guitar, a set of blown bottles played by compressed air and various hand held percussion.

On stage, Eric's percussion ensemble is arranged with the acoustic and bass guitars on four shelves of a black steel structure set up in the territory traditionally occupied by a drum kit. Each beater has a white LED that illuminates each time its solenoid is actuated. The vibraphone and marimbas are positioned either side of the performer, with the two guitar bots towards the front of the stage and the piano upstage left.

The guitar bots look very curious. The strings are mounted vertically and face the audience,

the contraption suspended from a curved support behind, which flexes as the motorised bridges fly up and down each string.

While Metheny was clear about what he wanted, he took the designers into uncharted territory.

As he explains: 'The inventors would get something to work and they'd say "isn't it cool that it works?" My thing is, it's cool that it works, but it's got to sound great. We spent a lot of time on sound. Jack DeJohnette contributed one of his drum sets and all of the cymbals while Gary Burton contributed the mallet instruments and picked out all the mallets. This meant I could really get a great sound from the instruments as well as having all these mechanical things going on.'

Eric Singer elaborates on the challenges of working on Metheny's commission. 'Pat is used to a large degree of musicianship from his players and the robots had to exhibit that same standard of musicianship. Making sure everything played as dynamically and as accurately as possible was a challenge. And then these things have to be as roadworthy as possible, because on tour they are going on and off trucks every day. They need to be maintainable and run with minimal intervention, so they could be relied upon to work, night after night.'

#### **BEAT THIS...**

The large percussion module that dominates the stage was described variously by concert-goers as being reminiscent of a pawnshop or hardware store. Singer elaborates on the complexity of his construction.

'There are 200 or so individual mechanisms. All the mallet instruments have a mechanism for each and every key and between those three instruments that's about 120 beaters. Most of the cymbals have two to four different arms on them with different sticks and different locations. The drums have at least two arms on them. The guitar bots don't have too many mechanisms, probably three or four, but the complexity of controlling them, internally from what the onboard microprocessors have to

do, is incredibly high. The guitar bots took the longest time to deliver because we were creating a new, more road-worthy instrument than the original guitar bot.'

#### **TAKE IT TO THE BRIDGE**

The guitar bots each have four strings, with a bridge that is driven up and down each of these strings by a timing belt. Singer describes the instrument as like having four performers with single-stringed slide guitars at your disposal.

'They can all play independently or together. Each has a string with a moving bridge. When it gets a note, the bridge is told to move to that position as quickly as possible and it's very quick. Because it has to seek while

*'The guitar bots are our speciality'*

it's playing the note, you get a little glide effect and that's part of the character of the instrument – that little bit of twang.

'The plectra are four guitar picks on a cube and the cube rotates a quarter turn each time it's told to pick. There's a damper, which lifts up to play and then damps back down to mute. It sounds simple but it was incredibly complicated to get it to work. It was the biggest robotic challenge I've had to date.'

Interestingly, Singer developed an optical sensor in which the string's waveform is used to modulate

**BELOW:** Eric Singer, founder of the Brooklyn-based LEMUR group and a leader in robotic instrument design. He created and built the robot band used for the Orchestrion project, working closely with Pat Metheny to develop the instruments further





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Knight Series is the embodiment of Castle's legacy of delivering real-wood veneers and sumptuous sound quality – the essence of class and refinement. With all its component parts manufactured, assembled, and hand-crafted in-house, the Knight series combines traditional cabinet making with the finest in British engineering design.

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the guitar's output, because a conventional electric guitar pick-up was too sensitive to hum from the motors around it.

Finding parts to build the *Orchestrion* was very time-consuming. As Singer explains: 'No-one out there is building motors and solenoids to be used on musical robots. You're always taking something and re-purposing it. And you have all those musical requirements as well. Like the components can't make ringing noises in the audio range, which has something to do with how you control them. Really they should make as little noise as possible and when you're talking about parts that are normally used in washing machines, where they don't care how loud they are, then it becomes a particular challenge.'

#### A MIDI ADVENTURE

The robot band is controlled from Metheny's MIDI guitar. MIDI is the industry standard protocol that transmits 'event messages' such as the pitch and intensity of musical notes to play, control signals for parameters such as volume, vibrato and panning, cues, and clock signals to set the tempo.

Singer continues: 'Pat is the first guy to use a MIDI guitar to drive the bots. I sat in his studio and watched

him send his MIDI guitar straight into the vibraphone and it followed right along with him. It was really quite remarkable how quickly it responded and sounded like it was playing in time with him.'

#### SUITE SOUNDS

In concert, Pat Metheny played all five compositions from his *Orchestrion* CD in order as a suite. After giving the audience some background to the project he next performed an improvised piece in which guitar, orchestra bells and piano played rapid arpeggios in

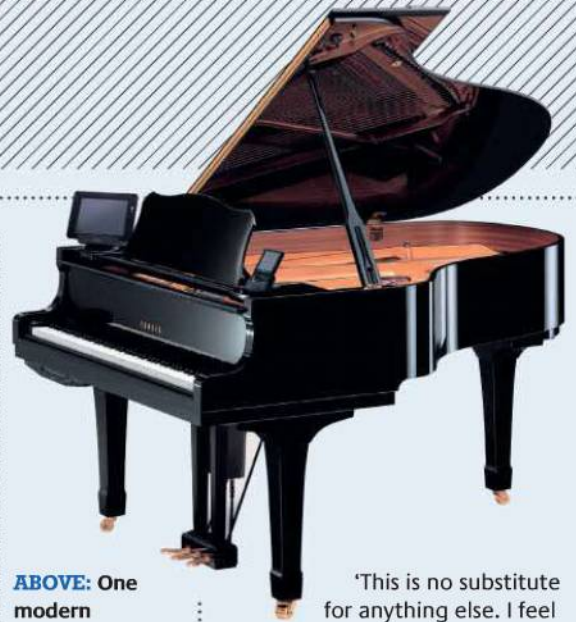
unison, with specific notes on his MIDI guitar appearing also to trigger different percussion hits.

In a second improvisation, intended to

showcase how he can control the robot band, Metheny played eight bars of guitar, layering three parts that continued to play while he then added eight bars each of drums, vibraphone, marimba, blown bottles and bass guitar – before soloing his guitar over the top of the arrangement. He controlled instrument selection by using foot pedals and a small screen positioned at waist height.

Metheny is very clear that his *Orchestrion* project is an additional area of activity that will dovetail with his work with other musicians.

'The bots are controlled via MIDI guitar'



**ABOVE:** One modern mechanical instrument used by Metheny is the automated Disklavier piano from Yamaha; here the keys are driven magnetically from scores on a hard drive or other storage

**BELOW LEFT:** A Xylobot used for the *Orchestrion* project; the MIDI interface takes signals from Metheny's guitar

**BELOW:** A single guitar bot – four individual strings, each with a moving bridge

'This is no substitute for anything else. I feel like I've been building this house over the years and I've got the trio room and the group room and this is another room to go into.'

So what is Metheny hoping to achieve with the project?

'There were lots of things about this that were essentials for me. It had to groove. It has to feel good. It has to have dynamics. So it has caused me to go underneath the hood and examine music in ways that I hadn't before. I do think that jazz guys in general, throughout most of jazz history, were the guys to do the research and somewhere around 1980, everybody just said "hey let's just do that!". And I've never really thought that works. I pre-date that, but to me, the jazz guys I admired always said "yeah, but..." and this is a big "yeah but".'

#### RISE OF THE ROBOTS

One of the aspects of a group of musicians playing together that's missing from the *Orchestrion* project is the interaction and interplay between musicians. Singer is adamant that his instruments have that capability. 'Pat has conceived this as a ten-year project. In the beginning stages he's done a lot of straight-up orchestration – in the same way you would orchestrate for synthesizers. But there's a big difference when you have live instruments playing. On tour he is starting to move towards improvising on the instruments where they are following his guitar.'

'In the future there's an opportunity to have instruments improvise on their own, based on a computer algorithm. You could say "analyse Coltrane and play a guitar solo that sounds like a Coltrane solo". The instruments are capable of doing that. It's just a matter of applying new software to them.'





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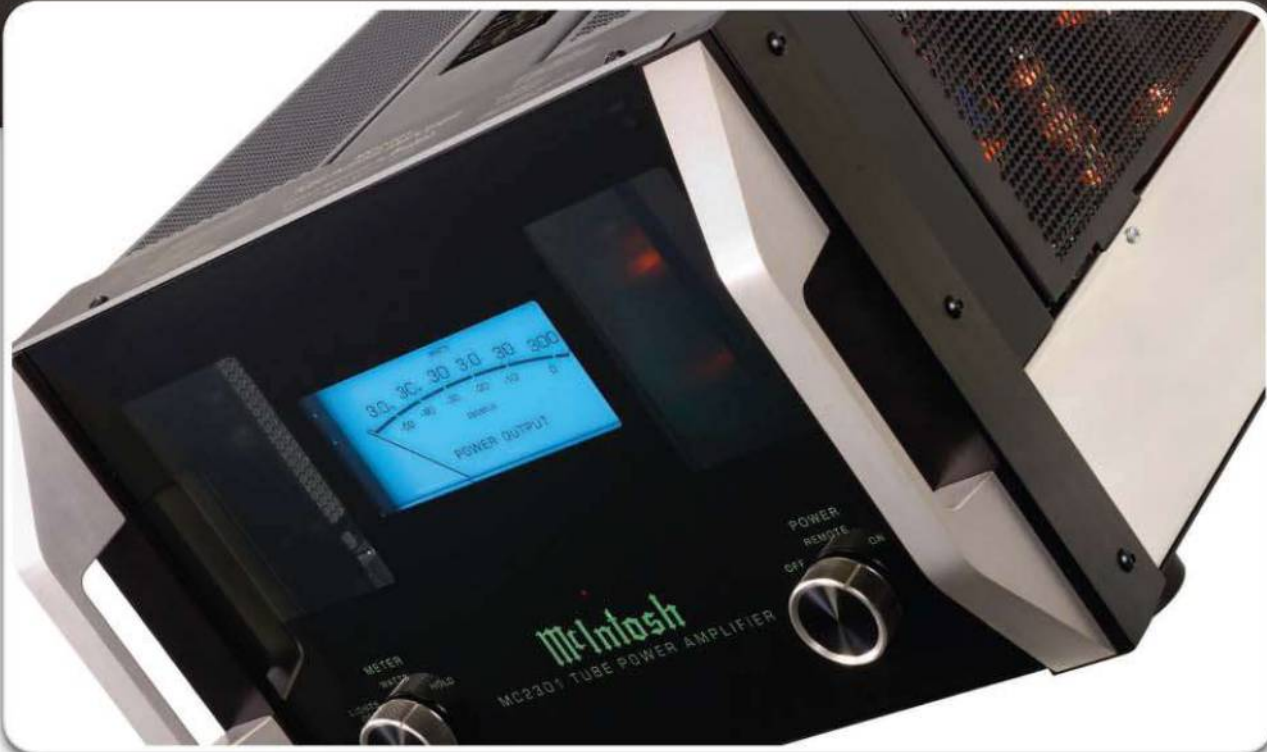
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# Thorens TD 309 (£1250)

One of the great turntable brands continues to re-invent itself, retaining 'classic' design aims but in a truly up-to-date execution – and at an affordable price

Review: **Steve Harris** Lab: **Paul Miller**

Looks can be deceiving. At first glance, you might think that the TD 309 was designed just as an eye-catcher, but in reality it is easily the most radical and innovative turntable Thorens has produced since the company was revived around ten years ago by the dynamic Heinz Rohrer.

For the TD 309 project, Rohrer called in Fink Audio Consulting of Essen in Germany, best known for its expertise in loudspeaker design. But, as Karl-Heinz Fink says, 'We are all turntable guys! We like turntables! And if you work on loudspeakers, you deal with vibration at a micro level, dealing with problems that are similar.'

## SPRING-DRIVEN THING

Despite appearances, the TD 309 is a true suspended-subchassis design, but the subchassis actually is the top plate of the deck. The suspension springs are hidden underneath, mounted at the corners of a moulded triangular support which forms the primary chassis.

Most companies that still make subchassis turntables have moved away from the coil springs used on the seminal Acoustic Research design and the classic Thorens models which followed. Even Thorens switched to leaf springs quite early on, while others substituted rubber-type materials. But coil springs were chosen for the TD 309 in order to get the resonant frequency down to a very few Hertz. This is difficult to achieve with rubber. Leaf springs were rejected as they tend to be stiffer in one direction than the other.

One problem with coil springs is that they can allow the subchassis to wobble sideways as well as moving vertically in the intended axis of the spring action. Loudspeaker technology provided a solution here. Each spring's upper housing is collared with a flexing membrane just like a speaker voice-coil suspension.

**RIGHT:** Thorens' new TP 92 arm design uses a straight alloy tube with a vibration-damping ring fitted midway along its length. The headshell or cartridge platform has a single-bolt fixing

In the classic subchassis turntables, the motor is mounted on the main chassis, driving the subchassis-mounted platter by a belt. This means that subchassis movements will affect the drive's stability, while the belt inevitably forms an unwanted part of the suspension.

So on the TD 309, the motor is mounted on the subchassis, in this case the main top plate, instead. It is decoupled by its special mounting, again using loudspeaker-type 'spiders.' One is visible at the top and another is hidden at the bottom of the motor. Belt tension can be adjusted, after loosening a single retaining bolt, by turning this whole suspended motor unit in its eccentric mounting.

In the past, as Fink says, 'Everybody and his dog used the same little Philips synchronous motor.' But one of the Thorens design criteria was that there had to be switching for 33 and 45 rpm, which with a synchronous motor would have meant resorting to old-style mechanical belt shifting. So the motor is a modern DC type, powered via a carefully-designed electronic speed control circuit which

is housed under the deck at front left, with a 33/off/45 switch accessible just under the front edge. Tiny screw adjusters are provided to allow fine pitch (speed) adjustment if needed.

## FROM BELT TO BRACES

After some experiments with third-party tonearms it was decided that the TD 309 had to have its own dedicated Thorens arm, and the design team tried to find the most logical way of getting good performance within the cost constraints.

The result was the TP 92. Its four bearings are ball-races sourced from MMB (Micro Miniature Bearing Company) of Japan, which provided a type used in measuring instruments. Freedom from stiction when moving very slowly was thought more important than a high ABEC precision rating, which is more relevant to high-speed use.

Fixed into the neat but massive-enough bearing block is a straight aluminium arm tube. The single bolt headshell fixing resembles the type used by Clearaudio, but in fact the idea originated earlier





with Thorens. The cartridge platform has a saddle-shaped top which sits snugly in the cut-away end of the tube. It cannot rotate but can be moved back and forth to change the arm overhang by 2.5mm, enough to allow the correct alignment with most cartridges.

This makes it easy to set the alignment and keeps the cartridge on the axis of the arm, avoid the twisting modes that occur with offset headshells.

There is a minor drawback, which is that hex bolts with deep heads can't be used. Also, as the carrier is very thin where the holes are countersunk, you will need shorter-than-usual bolts if mounting a cartridge with 'blind' holes.

From a resonance point of view, says Fink, it would be better to mount the cartridge part way along the arm rather than at the end, but this is hardly practical. In the end, a special vibration damper was added, in the form of a decoupled metal ring placed at a critical point near the middle of the tube. The method employed here resembled work Fink had done with BMR (Balanced Mode Radiator) loudspeaker drivers.

At the back of the arm, a threaded stub at low level holds the counterweight, which as usual needs to be wound forward to apply tracking force.

## CARRY THAT WEIGHT

In a sprung-subchassis turntable where the platter and armboard are suspended as one unit, there are usually three springs placed equidistant from the centre of gravity of the subchassis. Because of the weight of the tonearm, this centre of gravity will not be at the same point as the centre of the turntable platter. In the case of the 'Tri-Balance' TD 309, the suspension springs are placed at the same distance from the centre platter bearing. This gives perfect static balance but requires a means of balancing the weight of the tonearm, which otherwise would make the chassis sit lopsided. So Thorens provides a loose cylindrical weight, which is normally placed over the front-left suspension spring. In this position it exactly balances the Thorens TP 92 tonearm. Alternative weights can be provided if needed to balance other arms.

Finally, to get you started, the package includes a basic Audio Technica AT95B moving-magnet cartridge.

## MAKING SENSE

Listening started with the budget Audio Technica, but what I heard was a pleasant surprise. On Dave Brubeck's 'Blue Rondo A La Turk' from *Time Out* [CBS 62068], the piano was admittedly rather pinched, but it still had a rather admirable punchiness. Gene Wright's bass was firm and springy.

With Eric Clapton's *Slowhand* [RSO 2479 201, 1977], the Thorens seemed to dig out detail in a comprehensible way so that the songs made sense. The bass on 'Lay Down Sally' seemed full of bounce and well shaped, never becoming a muddy boom, as it can with this track.

Would the humble AT release the magic from the grooves of Joni Mitchell's *Blue* [Reprise KK4128]? It did. The sound was a little thin, bright and almost keening at the top and coarse in the midrange. But it had that un-fakeable quality of immediacy, of instant communication from the performer.

Even if the AT95 hasn't quite been around since *Dire Straits* [Vertigo 9102

**ABOVE:** Seen without its felt mat, the 2.3kg glass platter is placed frosted-side down on the alloy sub-platter. Suspension is adjusted through the three feet and large metal counterbalance

021] came out in 1978, listening to this combination was suddenly nostalgic, as if I was revisiting the sounds of yore. But it was much better than that suggests, giving a stable and solid image.

Turning to a classical favourite, *Sir John Barbirolli Conducts English String Music* [EMI ASD 521], I found a surprisingly good sense of depth and of the hall acoustic.

What had seemed like a veiling, on the Clapton record for example, became an acceptable mistiness here.

So how would the TD309 perform with a cartridge upgrade? My first move was to install the Ortofon 2M Red, which sells at around £80. Now, with 'Blue Rondo A La Turk', the rather thinned piano sound wasn't exactly fleshed out, but it acquired more detail and plangency. Morello's struck cymbal accents were now more striking, you might say, ringing out with bell-like clarity.

Clapton's 'Wonderful Tonight' from *Slowhand* did sound fuller and richer, with better detail. 'Lay Down Sally' rocked along, Clapton's vocal now solid and tangible. With the Barbirolli record, the Ortofon gave a grander sense of scale and depth.

Next step was to move up to a more luxurious moving-magnet, the excellent Roksan Corus Silver. Now Brubeck's piano sounded more like a real one, having percussive impact as well as body, and the same applied to the other instruments. When Brubeck went into 'Strange Meadowlark', you could almost forget to give the usual shrug of resignation that, well this was a CBS record pressed in the 1970s. It sounded better than that. ☺

'The deck has that un-fakeable quality of instant communication'

## TURNTABLE



**ABOVE:** Rear view shows the TP 92's decoupled counterweight, mounted lower than the arm tube itself.

With Clapton's 'Wonderful Tonight', the Roksan gave each strand of the music a more independent existence. 'Lay Down Sally' was crisply rocking, really foot-tapping and free of muddiness.

I'd wondered whether *Blue* might sound a little over-bright with the Roksan, but it was just right, with Joni's voice yearning and floating, getting you right in the heart, in a way it hadn't done with the 2M.

### MOVING ON UP...

Time to try a moving-coil. I watched the ruby cantilever of the Ortofon Cadenza Blue descend towards the first grooves of *Time Out*. Here was a very different, subtler sound, with rich textures just forcing you to realise, for example what an amazing sax player Paul Desmond was. Bass was deeper and the treble was smoothed out further. 'Strange Meadowlark' was lovely, the piano singing, and there was a stereo image you could walk around in.

As for Eric, well, the Cadenza Blue lent a dreamy, velvety quality to 'Wonderful Tonight', EC's voice pillowed in a complete spread of accompanying warmth. 'Lay Down Sally' was less punchy than with the Roksan, but the bass was deep and clean, the stereo stage expansive.

Elgar's 'Introduction And Allegro' now swept into the room with great panache, the fine bass quality underpinning the music, keying the size and sound of the hall, as well as making the double bass parts intelligible and meaningful.

Finally, I installed the Koetsu Black. In contrast to the effortless precision and pleasing detail of the Ortofon, the Koetsu added its

own gutsy dynamism, with a rather forward and well-textured midrange, relatively subdued high treble and a powerful if fairly unsubtle bass.

Partnered with an inadequate deck, the Koetsu can end up sounding merely too forceful and rather coloured, but I felt that the Thorens really helped it to do its thing enjoyably. It could produce an immediate impact, or add an appealing romantic bloom, as on 'Strange Meadowlark'.

Clapton's 'Wonderful Tonight' was rich and glowing, though the bass on 'Lay Down Sally' was just too much of a blurry thump. But the Koetsu sounded as if it was made to play Joni Mitchell, the guitars punchy, the voice sublime.

With Barbirolli and Elgar, the Koetsu was more successful than the Cadenza in some ways, if without the final bit of dimensionality added by the former's deeper bass. Yet it was more immediate sounding and perhaps more eloquent, too. ☺

### HI-FI NEWS VERDICT

This modern turntable improves on classic subchassis virtues, with low coloration, excellent imaging, great bass and fine rhythm. It makes a 'starter' cartridge sound better than it has any right to, and when you move on to a really good moving-magnet, it is absolutely outstanding. Despite its moderate price, it will embrace even exotic moving-coils too. An exceptional product, which is warmly recommended.

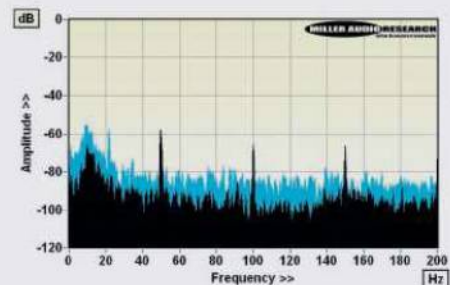
Sound Quality: 85%



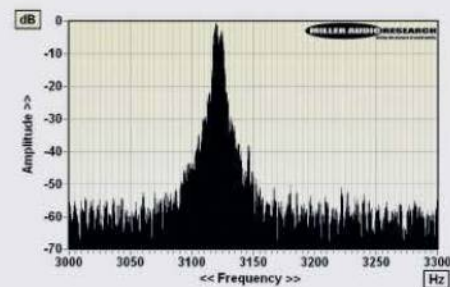
## THORENS TD 309 (£1250)

Long-anticipated, I'm pleased to say that this new Thorens turntable/arm package largely lives up to its billing. Setup is very straightforward and although our sample was running slightly slow at  $-0.89\%$  (just fractionally over 33rpm, as evidenced by the shift to a slightly lower frequency in Graph 2, below), this is easily corrected by the  $\pm 5\%$  pitch adjustment available to the DC motor. Because the platter is fashioned from glass, and not acrylic as is common these days, it carries more inertia than might be expected. The 12V DC motor is sufficiently powerful to bring this disc up to speed within 4-5 seconds and with decent stability thereafter, its peak wow and flutter amounting to 0.03% and 0.03%, respectively, which is well within the compass of far costlier decks. Do note, however, the 'split' main peak [Graph 2, below] which shows a dominant wow component at  $\pm 2.2\text{Hz}$ .

Provided Thorens' earth tag is employed, hum and noise are kept very low at  $-57\text{dB}$  (re. supplied MM cartridge output at 1kHz/5cm/sec) while the DIN B-wtd rumble is a very respectable  $-66.2\text{dB}$ , measured through the groove [blue spectrum, Graph 1 below]. This improves by about 1dB through the bearing itself, about 5dB behind the very 'quietest' solutions on the market. The TP 92 tonearm (with damping ring designed to attenuate pipe resonances along its length) has a higher-than-expected 15g effective mass and will suit lower compliance MC's as substitute for the standard MM offered here. Readers are invited to view a full QC Suite report for the Thorens TD 309/TP 92 turntable/arm package by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Unweighted bearing rumble from DC-200Hz (black infill) versus silent LP groove (blue infill) re. 1kHz at 5cm/sec. Hum harmonics are low (DC motor)



**ABOVE:** Wow and flutter re. 3150Hz tone at 5cm/sec (plotted  $\pm 150\text{Hz}$ , 5Hz per minor division). Was  $-0.9\%$  slow as supplied, but a  $\pm 5\%$  adjustment is offered

### HI-FI NEWS SPECIFICATIONS

Turntable speed error at 33.33rpm	33.04rpm ( $-0.89\%$ )
Time to audible stabilisation	4sec
Peak Wow/Flutter	0.03% / 0.03%
Rumble (silent groove, DIN B wtd)	$-66.2\text{dB}$
Rumble (through bearing, DIN B wtd)	$-67.5\text{dB}$
Hum & Noise (unwtd, rel. to 5cm/sec)	$-56.9\text{dB}$
Power Consumption	2W
Dimensions (WHD)	470x125x430mm

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# NAD M2 (£5000)

Cutting edge engineering, immense power and technical results that set new standards for 'digital' amplification... from NAD? You better believe it...

Review: **Richard Stevenson** Lab: **Paul Miller**

**I** find it very odd that the M2 is the most technically advanced and subjectively successful digital amplifier yet to grace my listening room. Until recently, right now in fact, NAD was not a company likely to spring to mind for its cutting edge technical innovation. The brand saw me through my penniless student days with a host of hi-fi products that majored on simplicity, great value and a remarkable immunity to spilt beer. But the M2 is very different. It is an end-to-end digital amplifier producing over 250W per channel [see Lab Report, p29] and offering a technical performance that evidently sets it apart at the price.

## MAKING WAVES

The story starts some four years ago with the creation of an innovative 'wave-form' amp by US company, Diodes Zetex Semiconductors. Talk ensued between Zetex and NAD, culminating in a collaborative architecture development at Zetex's UK-based R&D facility in Lancashire's very own silicon valley. Well, Oldham actually. From CD's 44kHz/16-bit signals through to off-server 192kHz/24-bit high-resolution audio the signal remains in the digital domain with all controls happening in DSP. Even the final analogue output to speakers is a gain by-product of the PWM switch-mode output stage rather than a conventional DAC. The M2 is not an evolution of the classic 3010, it's a revolution in amplifier design.

Understandably the M2 has more digital inputs than analogue ones. Consider the average CD-transport, DAC, preamp and power amp set-up. Along the signal path there are an incredible number of state and voltage changes, DACs, op-amps, filters and output transformers, each adding some

sort of signature and a lot of noise to the mix. Conversely, feed the M2 a PCM signal via S/PDIF or an AES/EBU output from a transport or, arguably better still, a server and the signal remains in a single state until the output. The result is spectacular technical specs and a noise floor that is seriously and unnervingly low. Play digital silence from a test CD at the M2's max volume setting and you'll hear nothing from the speakers – even with your ear pressed close to the tweeter. It is surreal.

The build quality, fascia display and day-to-day operation is everything we have come to expect from a £5k integrated amplifier. It is weighty, solid and high-end looking with only the unusual selection of terminals along the back to mark its unique design. It even gets quite toasty warm in use. On the analogue side there is just one pair of RCA stereo connections and one balanced XLR pair, both of which are immediately converted to PCM.

On the digital connectivity side you get an XLR AES/EBU bus and five S/PDIF inputs, two electrical and three optical, and an S/PDIF output of each flavour. As S/PDIF is pure-play PCM, those hoping to feed the

M2 with a DSD stream from an SACD player are out of luck.

The two sets of 4mm banana plug binding posts are gold-plated with their fashionable clear-plastic bodies offering wings to aid wrenching home onto spades or bare wire. In a world where custom install and multi-room commands a lot of the high-end business, the M2's back panel is equipped with an RS232 control port, 12V triggers and an IR remote connection.

For party animals NAD's soft clipping mode can be switched on from the back panel to reduce current as the amp approaches distortion.

## OFF THE MENU

The front is no less well-appointed with an array of buttons along the fascia for direct source select and menu access, and a large blue two-line display that can be dimmed if not turned off completely. At its dimmest it is unobtrusive in a darkened room, which is more than can be said for the laser-like blue power LED that draws the eye like a super-nova. The display itself shows input source, volume level and input signal sampling frequency – although the latter

**RIGHT:** The menu offers a 0-to-9dB trim and selection of 48kHz-192kHz sampling rates for its analogue inputs. A 'digital impedance compensation filter' adjusts the treble response of the M2 to account for the losses experienced into lower impedance speakers. Selections from 2, 4, 5, 6, 7, 8ohm to >8ohm are offered







frustratingly disappears a second or two after source selection.

The handset is very much old-skool NAD-dull with chunky and translucent rubberised buttons that look like they should be back-lit but aren't. The brushed aluminium top trim does elevate it above the plastic OEM parts-bin stuff but considering Unison Research can create a remote of substance and beauty for the £1300 Unico II integrated, the NAD's unit is far from special [see picture, p29].

More annoyingly still, the handset's 'Menu' button is actually one of the controls included for other Masters Series products and pointedly refuses to allow entry to the M2's menus.

On the plus side, the remote volume is responsive and the gain is nicely paced (continuous speed, non accelerating) in 0.5dB steps taking about eight seconds

from mute to max. This is mirrored on the main volume knob, offering a well-weighted three turns lock to lock.

Crawling over to the rack to access the menu button on the fascia is a pain. Once in the menus you can adjust for speaker impedance, input level trim on a source-by-source basis, polarity of the balanced XLR connection and upsampling rate from direct-input mode to 192kHz. The fascia buttons are suitably firm but each has its own 'click' noise, varying from solid and positive on the far left to alarmingly tinny and accompanied by an uninspiring metallic twang on the far right. This indicates something not particularly well secured or damped

**ABOVE:** The selected input and (for digital sources) incoming sample rate is indicated on a bold display. The volume/setup control operates from -70dB to +10dB in 0.5dB steps

'Frighteningly dynamic, digital amplification has come of age'

mechanically and I can't help thinking that the same item will be vibrating in tune with some upper-mid frequencies in use.

As the overall build quality is top notch, the buttons and remote let the side down on a five grand amp. Perhaps you can take the brand out of the budget market but not completely take the budget market out of the brand?

**DIRECT DIGITAL FEEDBACK AMPLIFIER**

Designed by Zetex Semiconductors and implemented in the M2 by NAD, the DDFA or 'Direct Digital Feedback Amplifier' is a true Digital Class D design, closer in execution to TACT's Millenium amplifier than D-Premier's Analogue/Digital Hybrid, tested last month. Like all Class D amplifiers, the M2 represents the audio signal as a stream of very high frequency pulses whose 'width' or duration determines its amplitude. Known as PWM or Pulse Width Modulation, this stream drives a high-speed MOSFET switching stage, an LC low-pass filter network being used right at the output to 'reveal' the desired audio waveform.

In practice the M2 takes any digital signal up to 24-bit/192kHz and multiplies this to 288kHz (x1.5) followed by a further 375x oversampling to a massive 108MHz. En route, the data is truncated from 24-bit down to a few bits which, in turn, produces a large error signal that manifests as a broadband noise from DC up to the 108MHz sample rate. Digital noise-shaping is used to squeeze any of the noise that appears from 20Hz-20kHz (the audio range) out to higher frequencies [see Lab Reports]. Here's where we see the key difference between analogue and digital Class D amplifiers: in the former the pulse width is infinitely variable while in the latter the number of possible widths used to describe the audio is determined by the number of bits. Furthermore in a digital design, the switching frequency is directly synchronised to the incoming digital audio sample rate (in this case 288kHz). Furthermore, Zetex enhances the linearity of its digital amp by feeding back a digital error signal, comparing the final high-level PWM switching voltage with the low-level PWM data - hence 'DDFA'. PM

**SOUND OF SILENCE**

Although these issues soon become a moot point, because the M2 is the most exciting integrated I have listened to by a country mile. Frighteningly dynamic, immensely detailed, astoundingly neutral and graced with a musical articulation that compares favourably with pre/power combos costing many times the asking price. Digital amplification has come of age.

The first quality you hear of the M2 is its silence. Simply getting your ears used to the lack of background hiss is quite an experience and one that will have you setting the volume way, way too high before the music starts. Shoot me now for ever writing that an amp offered 'inky black silences' - they were all rather grey and wishy-washy by comparison.

Suddenly the recorded noise floor becomes prevalent, all those re-mastered '70s and '80s CDs showing their analogue heritage as clear as day. Even with modern discs, little hiccups and artefacts of the recording process are laid bare to analyse and ropy pressings are given no quarter at all. Harsh recordings sound harsh, grainy recordings sound grainy and flat recordings

## DIGITAL AMPLIFIER



**ABOVE:** Inside the M2 which employs separate switchmode power supplies for the input and modulator stages plus each of the L/R MOSFET output switching stages

sound flat. The M2 is as simple and as ruthless as that. Of course, this accuracy is not achieved by a low noise floor alone and is testament to the M2's fabulous resolution of detail across the spectrum from its potent and expressive bass to its smoothly extended top end.

### LET'S RIP...

After some convoluted high-tech shenanigans (and several calls to our resident audio server guru Keith Howard) I ripped Eleanor McEvoy's Yola stereo SACD to a NAS Drive in 96/24 and outputted it via a quality PC-sound card as electrical S/PDIF to the M2... where the signal is upscaled to 192kHz. But this digital faffery really does not seem to affect performance as the results are spectacular, presenting an absolute showcase for all the M2's abilities.

The first keyboard notes of track one, 'I Got You To See Me Through', emerge dramatically from the cavernous silence offering a immediate rush of hi-fi wow-factor dynamics. By track two, 'Isn't It Late',

the opening drum sequence shows the M2's bass as incredibly tight and articulate with a depth that no integrated has the right to plumb. The bottom end has an addictive combination of dryness, textural detail and sheer scale that is so very rare in audio equipment without mortgage-size price tickets. It urges you to dial in volume to really feel the transient attack, whereupon the M2 rewards such behaviour with simply more of everything. The balance, scale and dynamics simply increase linearly without a hint of tonal-change – which is quite strange if you are used to listening to analogue transistor amps. Such is the cleanliness of the high-gain performance you will almost certainly find yourself listening at much higher levels than usual.

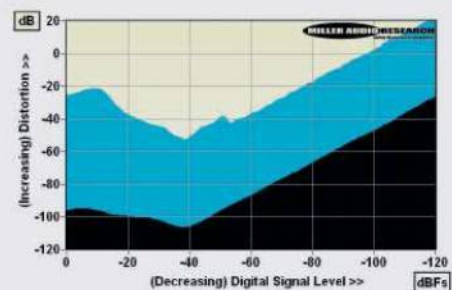
By 'Did I Hurt You' the M2 brings forth its analytical talents, ruthlessly exposing the over-saturated recording of the tracks' harder hit piano notes. I know this track intimately but I suddenly felt my warm and cuddly feeling towards

### NAD M2 (£5000)

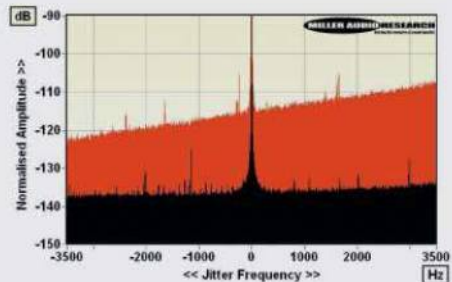
The following measurements represent the performance of NAD's Zetex-driven digital core and the graphs may be compared directly with those obtained for the Devialet D-Premier ADH amplifier [HFN, Apr '10]. As we discussed with the D-Premier, the output at 0dBfs (peak digital) is not the customary 2V but a full 49Vrms in NAD's case, developing 300W/8ohm. Distortion is impressively low through bass and midrange – typically between 0.0018-0.00056% over the top 40dB of its dynamic range – but increases to >0.1% at frequencies >10kHz. NAD quotes far lower HF distortion than this but also specifies the use of a low-pass filter between the M2 and its test rig to prevent the amplifier's ultrasonic requantisation noise from interfering with the measurements. Unfortunately, filtering the noise also filters out the distortion harmonics it was supposed to be measuring in the first place...

No such limitations are imposed by our test regime and so the 'wave' of ultrasonic noise rising outside of the M2's audioband (-89dB/30kHz, -70dB/40kHz and -65dB/100kHz re. 0dBW) is reflected in the high frequency THD+N plot [blue trace, Graph 1 below]. The same noise differentiates the (very low) 24-bit jitter plots at 48kHz [black spectrum peak at 12kHz, Graph 2 below] and 96kHz [red spectrum peak at 24kHz].

Between 20Hz-20kHz, the A-wtd S/N is a fabulous 94dB (0dBW) or 118dB at full output. The response with 44.1kHz/48kHz inputs reaches -0.2dB/20kHz, stretching to -0.4dB/45kHz and -6.5dB/90kHz with 96kHz and 192kHz inputs, albeit with some loss in flatness. Low-level resolution is exceptional – true to within ±0.2dB over a 110dB range. PM



**ABOVE:** Distortion vs. digital signal level from 0dB (225W) to -120dB (0.225nW) with 24-bit data at '0.0dB' vol. position (1kHz = black; 10kHz = blue)



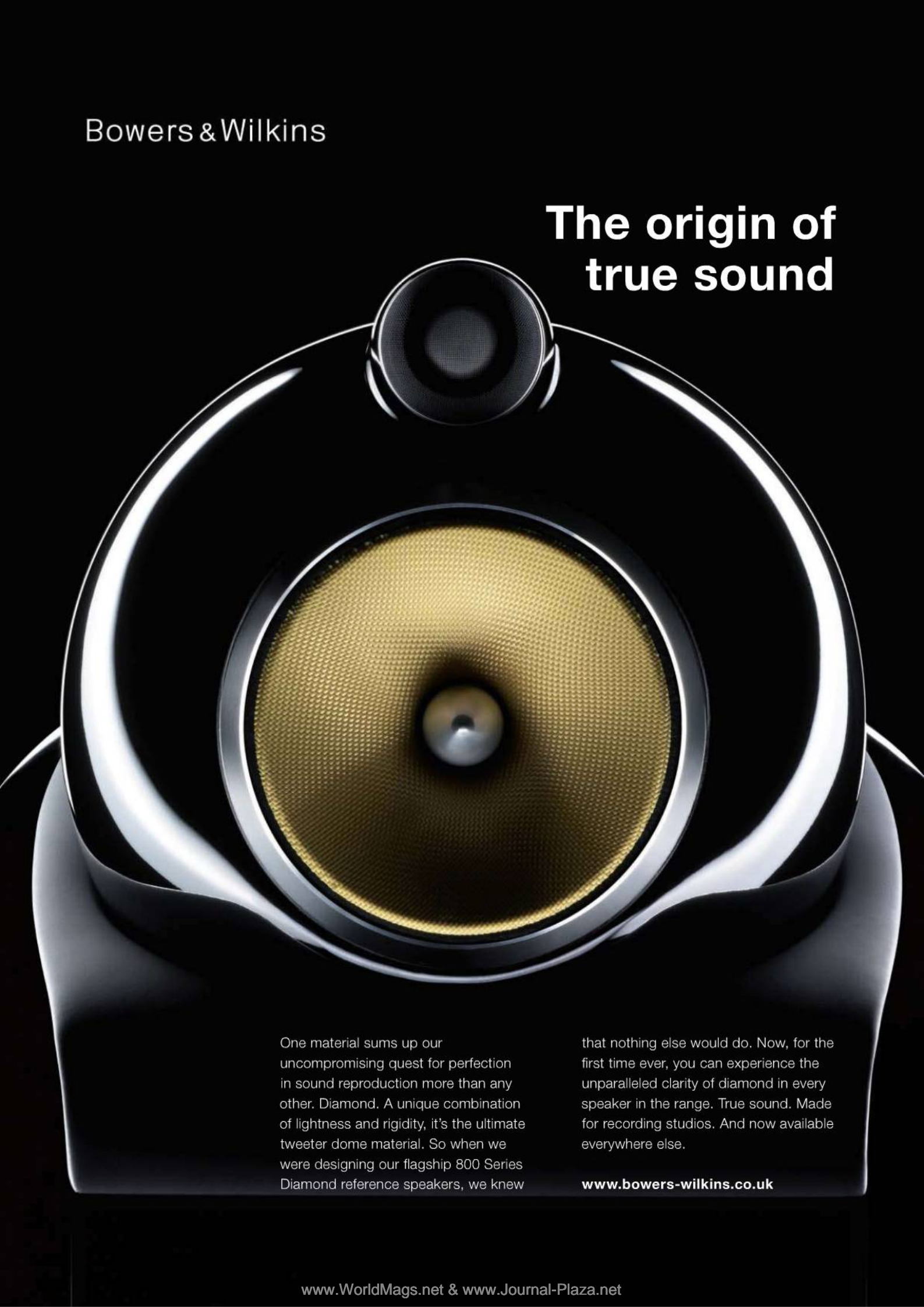
**ABOVE:** High resolution jitter plot showing 48kHz/24-bit (black) and 96kHz/24-bit data (red) at 10W/8ohm output. Note ultrasonic requantisation noise

### HI-FI NEWS SPECIFICATIONS

Maximum Output Level (0dBfs)	49.0Vrms
A-wtd S/N Ratio	118.5dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.0023% (225W) / 0.0006% (0.23W)
Distortion & Noise (10kHz)	5.6% (225W) / 0.56% (0.23W)
Frequency resp. (192kHz/24-bit)	+0.2dB (10Hz) to -6.46dB (90kHz)
Digital jitter (48kHz/96kHz, 24-bit)	15psec / 290psec
Resolution @ -110dB	±0.2dB
Power efficiency	70% (225W)
Dimensions (WHD)	435x148x502mm

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## DIGITAL AMPLIFIER



**ABOVE:** Bi-wire 4mm speaker posts are floating (balanced) so care must be taken with 'grounded' speakers. The M2's inputs include balanced (XLR) and single-ended (RCA) analogue with two coaxial/optical and one AES/EBU digital. NAD's soft-clipping power option is also selected here

its emotional charms being diminished by an urge to shoot the recording engineer. In fact, by the time I had listened to the entire SACD I could tell that it was recorded at either two different times or even in two different studios. There are a number of subtle balance changes and differing levels of recorded hiss between tracks, something I had never noticed before despite playing this disc through probably 50 different amplifiers. Wow. No, really, wow.

### TIME TO REFLECT

Playing the same disc through my Sony SCD1 affords direct A/B/C comparison between digital, single-ended RCA and balanced input, and the results proved interesting. Switching to either of the analogue sources immediately added a thickening in the upper bass that congested the mix, accompanied by a subtle reduction in imaging width.

This reflects on everything from the CD player's DACs and type/length of analogue interconnect to the M2's ADCs, and made no sense at all. This is a digital amp and the analogue inputs are pure legacy fitment, perhaps for an outboard RIAA stage. Otherwise, don't go there, the M2 offers so much more with a digital input.

Which leaves me reflecting on the M2 as an overall product. There is no denying its stunning analytical abilities and ultra-flat balance but I do wonder if some might not prefer a more rose-tinted presentation. The very top of McEvoy's voice has a level of natural sibilance that is quite prevalent if you hear her live, and the M2 doesn't hold back in exposing that on her recordings.

Likewise a romp through my AC/DC back catalogue on CD reveals the brightness and splashiness in every recording with merciless precision, somewhat detracting from this classic rock's fun demeanour. *Back In Black* sounded great but I never found myself wanting to wind up the volume, drink Super Strength lager and stage dive off the sofa. Happens all the time usually.

Don't get me wrong, this I not a bright or forward-sounding amp. Its lack of coloration and sheer resolution throughout the top end bring every note into stark relief – even the ones that might have been better left rolled off or swamped by other frequencies. For that reason I suspect the M2 will absolutely polarise opinion. If you are a fan of vinyl character and tube amplifier warmth then the M2 will hold all the appeal of root canal surgery. If you like your hi-fi dynamic, analytical and, above all, accurate, then start saving for an M2 as there is nothing else like it at the price. ☺

### HI-FI NEWS VERDICT

The M2 is the first digital amplifier I have listened to, but the best integrated amplifier – period. A revelation in almost every audio respect, its accuracy, dynamics, instrumental separation and detail resolution set new standards at the price. Revealing epiphanal micro-detailing and recording rubbish in equal measure, it is as ruthless as it is stunning. NAD can be proud of this digital engineering triumph.

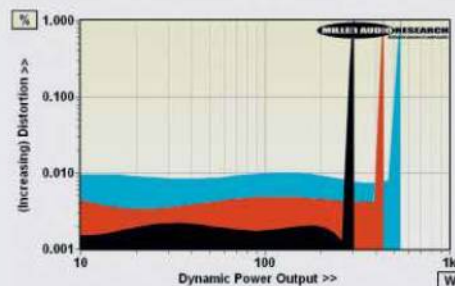
Sound Quality: 88%



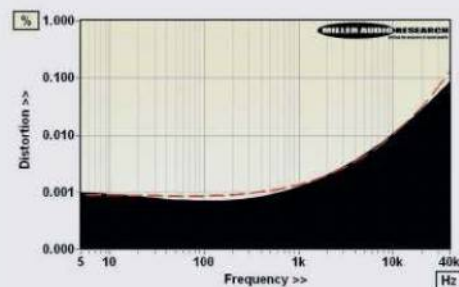
## NAD M2 (£5000)

Measured via its balanced analogue inputs and with the 192kHz sampling option selected, the M2 offered a massive 2x300W/400W power output into 8/4ohm loads, increasing slightly to 305W, 440W and 545W into 8, 4 and 2ohm loads under dynamic conditions. Lower impedances are no-go as the M2 senses loads as low as 1ohm and promptly switches itself off [see Graph 1, below]. Either way, while the M2 does not have the load tolerance of the D-Premier [HFN, Apr '10] it is still mighty capable with a usefully low <0.02ohm output impedance up to 1kHz, beyond which it rises to 1.5ohm/20kHz and 10.5ohm/45kHz as a function of its output filter network. This inevitably influences the final M2/speaker response in line with the speaker's own load impedance, which is why NAD offers a programmable variation in its HF response to suit different loads from 2ohm to >8ohm.

Set to '8ohm', the amplifier's response is +0.8dB/20kHz into an open load but flat to -0.2dB/-1.9dB/-5.0dB (at 20kHz) into 8/4/2ohm loads. As a result, the M2 can be engineered to sound 'brighter' or 'smoother' depending on its output setting. Otherwise, it has a fabulously wide 94dB A-wtd S/N ratio (re. 0dBW), 0.0dB channel balance and >90dB channel separation. Distortion (plus noise) is still influenced by Zetex's noise-shapers [see Graph 2, below], hence the increase from 0.0008% to 0.13% (5Hz-40kHz, '0.0dB' volume setting, 10W out). Readers are invited to view comprehensive QC Suite test reports detailing the NAD M2's digital and analogue performance by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red) and 2ohm (blue) speaker loads. The M2 switches off into 1ohm loads



**ABOVE:** Distortion + noise versus extended frequency at 10W/8ohm (black = left, red = right channel). Requantisation noise causes the lift in THD+N at HF

### HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	300W / 400W
Dynamic power (<1% THD, 8/4/2ohm)	305W / 440W / 545W
Output impedance (20Hz-20kHz)	0.019-1.5ohm
Frequency response (20Hz-20kHz)	+0.0dB to -0.18dB (8ohm setting)
Input sensitivity (for 0dBW/225W)	93mV / 1430mV (0.0dB volume)
A-wtd S/N ratio (re. 0dBW/225W)	93.5dB / 117.0dB
Distortion (20Hz-20kHz, 10W/8ohm)	0.00072-0.088%
Power consumption (Idle/Rated o/p)	84W/640W (1W Standby)
Dimensions (WHD)	435x148x502mm

# Nola Micro Grand Reference (£12,000)

Can Nola downsize its ten-driver Baby Grand Reference floorstander to make it room-friendly for the UK?

Review: Ken Kessler Lab: Keith Howard

**R**ibbon tweeters – you gotta love 'em for their speed, extension and clarity. But if we're no longer living in a world that supports full-range ribbon systems, then you have to admire Nola for using the technology in its top models. Inevitably, when the manageable (size-wise) Micro Grand Reference arrived (£12k inc. stands), my interest was piqued.

It started when I saw a thin foam square protecting the ribbon during shipping. Removing it betrayed the tug of some *serious magnets*, but it stayed in place while Ralph, from Artisan Audio, set up the speakers. In under a half-hour, he'd positioned them on their dedicated stands – lightweight and reminiscent of Russ Andrews' Torlyte, only with a heavy gloss black finish to complement the luscious rosewood of the speakers themselves.

A key part of Nola philosophy, the stands act as an energy path. They're spiked down below, but ball-bearings sit between the stand's top plate and the speaker. So they rock. Literally. This creates the only fiddly bit of the set-up procedure. If the stands aren't level, the speaker won't sit squarely. This may or may not affect the sound, but it will gnaw at you because it just won't look right, like a crooked painting in your dentist's office. I handed Ralph a spirit level, and he sorted it in seconds.

Although this didn't apply in my room, which is built directly onto terra firma, the stand's special ball bearing isolation system was also developed to reduce the influence of floor-borne vibrations. Nola designer and CEO Carl Marchisotto explained that, 'The Micro employs a built-in double platform base with ball bearing isolators to reduce coloration. The stand was designed expressly to minimise the "acoustic presence" of a stand, so it can get out of the way of the music. This turned out to be the most effective method to isolate the system from the floor and results in lower coloration and greater dynamics'.

It's odd to be dealing with the stands before the speaker, especially since they're optional, but I doubt anyone would not buy them once they're demonstrated together. In no small way, the looks are a plus, for most speaker stands are hideous metal tubing affairs. These resemble fine Chinese furniture, having a black lacquer finished to piano standards.

## GRAND IDEAS

Carl stated quite clearly that this speaker was designed to deliver the same musical experience as the Baby Grand, but where space is an issue. The Baby Grand occupies a space of 1580x460x560mm (hwd); on its stand, the Micro needs only 1155x280x280mm (hwd) – quite a reduction. To achieve this, Carl quartered the number of 110mm cast-frame alnico magnet mids and ribbon tweeters, swapping two 240mm woofers for two 120mm cast-frame magnesium woofers.

Like Vandersteen and a couple of others, Nola employs 'open baffle' technology for its mid and treble units; the woofers reside in a ported enclosure. Aesthetically, Nola deals with this by producing a cabinet that looks like a solid box, rather than a cube with a small panel perched on top. But it's a clever illusion: the upper section is a baffle backed by a frame with grilles filling the apertures, so it looks like a conventional parallel-sided box.

Ironically, there is no grille for the front, which may upset the house-proud, who don't like looking at naked drivers. It has yet to cost Nola a sale, but Carl said he'd find a way to deal with it if necessary. He just doesn't like the damage a grille inflicts on the sound. The grilles at the sides are strictly there for looks and do not affect

**RIGHT:** Supplied in left- and right-hand mirror image enclosures, *sans grilles*, the speakers were set up with the ribbons on the inside; note machined cones fitted to the dedicated stands





dispersion or tonal balance, as would cloth between driver and listener.

Nola employs a 45° mirror-imaged array for the midrange and tweeter, and further evidence of serious attention to detail because this demands mirror-imaging of the speaker baffles, unlike less-costly vertical arrays which don't require left/right enclosures. The twin woofers, custom-made for Nola by SEAS, are fitted to a rear vented enclosure, the vent being flared to eliminate port noise. The midrange operates as an open baffle dipole, while the open baffle ribbon tweeter eliminates any type of extra diaphragm, as the ribbon is the diaphragm. Carl succinctly states that, 'The lack of an enclosure [in the midrange and high frequencies] eliminates a large source of coloration.'

### A REAL BLAST

Fed by the Marantz CD-12/DA-12 and Quad CDP-99 II CD players, Audio Research Ref 5 preamp, Quad II-eighty monoblocks and Luxman C-600f/M-600A pre/power combination, with YTER and Kimber cables, the Nolas responded with equanimity regardless of the components. It was an case of instant puzzlement: how could a speaker be so revealing, open and detailed, yet be so immune to mismatches?

So I tried the McIntosh C2200/MC2102 pre/power pack, a Musical Fidelity player, the Pure i-10 iPod dock with a Nano: something about the Nolas targeted virtues rather than flaws, though we know that such selectivity is impossible.

Keep this in mind, because it made assessing them both easier and trickier. Blasted euphony...

'The bass!  
It's so clean,  
clear, controlled  
and coherent!'

My initial burst with the speakers came courtesy of the superbly-recorded Keb' Mo' treasure, *Peace... Back By Popular Demand* [Okeh/Epic EK92687] and the experience negated the admittedly superb demo I'd heard at CES of one of the Micro's larger siblings, with open reel tapes. The bass! So clean, clear, controlled, coherent! I'm running out of 'C' words – the bass was nearly on a par with the Wilson Sophia 2s, my reference speaker. Slightly cooler, perhaps, but no less impressive.

With the lilting take of 'Get Together', the system just ebbed and flowed, the most liquid-sounding reproduction I've heard of this all-time fave demo disc, the lower registers filling the room with tactile, uncannily authentic bass. But even that didn't prepare me for the lone piano

on 'The Times They Are A-Changin': the requisite ring to the upper keys, the richness in the mid and bass... if tonal accuracy was all we needed, then the Micro is a champion speaker system.

Two other qualities, however, came into play to raise the speaker even higher up the food chain. The first? The vocals were as natural-sounding as one could hope for, belying the disc's digital origins. Nothing marred the phrasing, the voicing – no rasp, no sibilance. But the second framed all of it: utterly transparent openness, reminiscent of Apogee's Diva when driven by a kilowatt of Krell power. You felt as if you could walk around the instruments.

Perhaps the CD was making life simple for the Nolas, given that I'd already noticed their freedom from mismatching. Carl warned me not to worry about the impedance, what he called the 'static' ➔

### MASS MURDER

Carl Marchisotto hates mass. Not the Catholic kind, but the sort that makes speakers sluggish. 'It's about resolution. Our ribbon tweeter has 26 times less moving mass than any known dome. Domes with exotic materials may solve one problem, but they introduce others, which is mass. Diamond domes may be stiff and not break up, but they are heavy. Ribbons offer better resolution and detail. The lack of coloration due to low resonance allows them to be very smooth. Our ribbon – with over 2lb of neodymium magnets – is built just for us in California.' So, too, the proprietary woofers. 'Only 8g moving mass, the speed equivalent to an electrostatic. Only,' he adds, 'with dynamics.'

## LOUDSPEAKER

### NOLA MICRO GRAND REF (£12k)

We couldn't verify Nola's claimed 86dB sensitivity for the Micro, our pink noise figure being about 2dB lower at 83.8dB. In the context of an increasing number of speakers achieving 89dB or higher, this makes the Micro unfashionably insensitive. As the first graph below shows, the on-axis frequency response trend – measured on Nola's suggested axis – is far from flat, with a decline towards 2kHz being followed by a kick up at 3kHz and another decline thereafter before a last kick-up beyond 14kHz. This is reflected in quite high frequency response errors for a speaker of this price, of  $\pm 5.0\text{dB}$  and  $\pm 4.9\text{dB}$  respectively, 200Hz–20kHz. Pair matching error is a little on the high side too at  $\pm 1.5\text{dB}$ , with much of the disparity occurring between 850Hz and 4kHz, where the ear is highly sensitive.

A 4ohm minimum impedance is specified but we measured a minimum modulus of 3.2ohm – consistent with a nominal 4ohm impedance rating. Impedance phase angles are relatively low but the EPDR (equivalent peak dissipation resistance) falls to a minimum of 1.8ohm at 110Hz. All told, then, the Micro presents only a moderately challenging load to the amplifier. Given its low sensitivity, the Micro's 62Hz bass extension ( $-6\text{dB}$  ref 200Hz, diffraction-corrected near-field measurement) is a little disappointing. High frequency extension fares much better but the ribbon tweeter's 1.9% THD at 10kHz is poor. Linear performance of the tweeter in the time domain is much more impressive, as the fast, clean high treble decay in the cumulative spectral decay waterfall confirms. Low-level resonant ridges are visible at lower treble frequencies, probably representing breakup modes in the midrange cone. KH



**ABOVE:** Feeding these stout terminals, below a flared port, is a hard-wired crossover with flat-wound oxygen-free copper inductors and polypropylene capacitors

(meaning the speaker's 86dB rating) versus the real-world behaviour of the speakers. At no point was power an issue; the Quads were a match made in heaven, the Class A Luxman positively salacious. But it was all too easy, so I dosed it with some grunge.

### GOOD INTENTIONS?

Percussion and bass marriages rarely plumb the muddy depths of Nirvana, and there's something about 'Heart-Shaped Box' from *In Utero* [Geffen GED24536] that seems designed to confuse fey sound systems.

Bass player Novoselic and drummer Grohl might not have altered the mix if they'd monitored the recording 17 years ago through Nolas – had they existed – because the album seems deliberately dark and dank. It could even be called 'swampy' had it come from America's southeast rather than northwest. Regardless, the Nolas provided the possibly unwelcome opportunity for the listener to focus on individual instruments, rather than the entire deluge. Which asks of the listener, do you want such detail, especially if that may not be the artist's intention?

I turned to the mono Beatles re-masters, which pre-date grunge (although contemporary with the early Kinks) to hear 40-year-old tracks sounding as if they were recorded by audiophiles. George Harrison's early sitar flourishes

possessed metallic twanging to set your cilia waving, just as would a real sitar if you've been blessed enough to hear one in person. Meanwhile, George Martin's piano solo on 'In My Life' took on a presence that nestled eerily between the real and the aetherial.

### GRAND FUNK

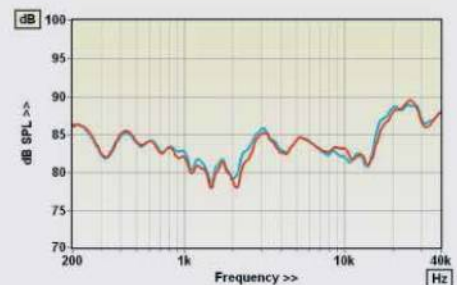
For all of the neutrality, detail and clarity, there's something 'gossamer' about the small Nola. It caresses sweet voices, strings and the space in which they're recorded.

Then it went all funky with Little Feat's 'Tripe Face Boogie', and I realised that this is a loudspeaker which will never, ever bore a sophisticated listener. ☺

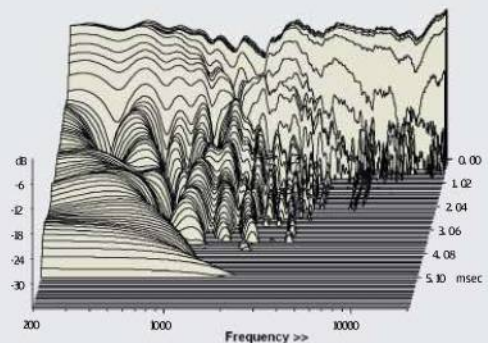
### HI-FI NEWS VERDICT

Even though they're out of fashion, ribbons are sacrosanct for me. Thus the Micro Grand Reference was a trip down memory lane: while not Nola's intention, they reminded me of why I worshipped Apogees. This Nola delivers something special: the open, fast, detailed sound of a bi-polar membrane, but in a box that doesn't require a panel's breathing space. Costly, quirky, but so rewarding. And that bass!

Sound Quality: 82%



**ABOVE:** The forward response of this latest Nola design shows a series of broad troughs and peaks



**ABOVE:** Waterfall shows a clean treble decay but some breakup modes are evident through the mid

### HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83Vrms – Mean/IEC/Music)	84.5dB/83.8dB/83.4dB
Impedance modulus min/max (20Hz–20kHz)	3.2ohms @ 140Hz 15.3ohm @ 20kHz
Impedance phase min/max (20Hz–20kHz)	$-42^\circ$ @ 95Hz $40^\circ$ @ 9.2kHz
Pair matching (200Hz–20kHz)	$\pm 1.5\text{dB}$
LF/HF extension ( $-6\text{dB}$ ref 200Hz/10kHz)	62Hz / $>40\text{kHz}$ / $>40\text{kHz}$
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	1.5% / 0.8% / 1.9%
Dimensions (HWD)	645x292x292mm



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# hi-finews GROUP TEST

Newcomers and old favourites from some of the biggest names in vinyl replay, but how will these six tonearms fare when brought up to speed using the very latest test technology?

## TONEARMS £500-£1500

### TESTED THIS MONTH

LINN AKITO	£795
ORTOFON TA-100	£1000
PRO-JECT 10cc Evolution	£1000
REGA RB1000	£995
ROKSAN NIMA	£490
SME SERIES IV	£1495



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### • CD PLAYERS • TURNTABLES • CARTRIDGES • SPEAKERS • TONEARMS • HEADPHONES • INTERCONNECTS •

**W**ind the clock back 100 years and the manner by which listeners adjusted the tone of their gramophone was in their choice of needles and the materials employed to form the player's arm and acoustic horn. Among the privileged who could afford the luxury of a record player in their homes emerged the first audiophiles, who experimented by changing their 'tonearms' to alter the subjective sound of their discs.

#### RUN SILENT, RUN DEEP...

A century on, dedicated vinyl lovers still endeavour to play records as accurately as possible. While a turntable spins the record, a tonearm holds the cartridge in place. To hear all the treasure hidden within the delicate groove it's essential that nothing moves other than the cartridge's cantilever as it's displaced by the minute movements of the stylus tracking a wiggly path through the black stuff. A stable motor unit is paramount; a good cartridge/stylus is essential. And the quality of the tonearm remains as important as it ever was.

While swapping cartridges is a necessity as cartridges/styli don't last for ever, changing arms is something only dedicated hobbyists should embark on, as an understanding of arm geometry and correct setup of overhang is mandatory, along with precise alignment of the stylus's azimuth, zenith and vertical tracking angle (VTA) in order to achieve optimum playback quality. (You'll find plenty of helpful information at [www.gcaudio.com/resources/howtos/cartbasics.html](http://www.gcaudio.com/resources/howtos/cartbasics.html).)

Remember, any cartridge/tonearm combination will exhibit resonance at a specific frequency due to the interaction of the cartridge acting as a spring and the weight of the arm acting as a mass. How the arm/cartridge interacts with the turntable also determines how the combination will sound. Consequently the knowledge of a specialist dealer, experienced in the successful 'marriage' of various turntable/arm/cartridge combinations, must not be underestimated.

For this comparative test we used a Clearaudio Innovation Compact

turntable sited on a Townshend Audio Seismic Sink Stand. Clearaudio supplied armboards suitable for mounting each model of arm, as fixing arrangements vary between manufacturers. The cartridge used was Ortofon's sublime Cadenza Blue, a moving coil design with ruby cantilever [see *HFN*, Mar '10].

#### THE RECORDINGS...

Music used for auditioning included the title track from Miles Davis' *Tutu* [Warner 925 490-1], 'Little Wing' from Stevie Ray Vaughan's *The Sky Is Crying* [Sony/Epic EPC 468640 1] and 'Lucille Has Messed My Mind Up' from Frank Zappa's *Joe's Garage, Act One* [CBS 86101]. Also enjoyed was the Chicago Symphony Orchestra's performance of Rimsky-Korsakov's *Scheherazade* conducted by Fritz Reiner in 1960 [RCA Living Stereo recording; audiophile pressing on Chesky Records RC4] and Stevie Wonder's timeless classic 'Superstition' from 1972's *Talking Book* LP on the Tamla Mowtown label [STMA 8007].

REVIEWS BY JOHN BAMFORD  
LAB TESTS BY PAUL MILLER

### • CD PLAYERS • TURNTABLES • CARTRIDGES • SPEAKERS • TONEARMS • HEADPHONES • INTERCONNECTS •

# Linn Akito (£795)

Linn Products provides scant information about the specific design elements of its 'budget' Akito and high-end Ekos tonearms save that they employ ultra low-friction bearings, assembled in a dedicated cleanroom in its Glasgow factory.

Given the Akito's dowdy appearance with textured black finish, Linn's detractors complain that it's overpriced since it has evolved from considerably cheaper LVX+ or 'Linn Basik Plus' models that the company used to source from a Japanese OEM supplier back in the early '80s. Funny, that. And I too can recall when a perfectly respectable terraced house in London could be purchased for less than £50k...

Linn's entry-level arm first changed name from Basik to Akito precisely 21 years ago. Today's Linn tonearms are fabricated entirely in-house. The oil-damped cueing device works as delightfully as those fitted on the more costly Ortofon, Rega and SME arms in this group, while the calibration dial at the rear of the counterweight proved pretty much spot-on when its accuracy was checked with an electronic downforce gauge. The arm is supplied with a decidedly unpretentious-looking arm cable with plastic connectors.

## THRILL SEEKING

From the rousing blasts of the opening fanfare of the Chicago Symphony Orchestra's *Scheherazade* through to the staccato plucked strings early in the first movement, the sound of the Akito was vivid, immediate and dynamic. It also proved capable of portraying subtle expression, the

music flowing effortlessly in a wide, spacious acoustic extending beyond the loudspeaker boundaries. String tone was vibrant and rich in colourful texture. Miles Davis' 'Tutu' was similarly brimming with vigour, perhaps a little forward on this 'hot' cut, yet not so unrestrained as to prove overly aggressive.

Meanwhile the intelligibility of pitch in the bass registers was quite startling, the formidably deep and weighty bass lines sounding uncommonly melodic within the busy production.

Despite the muted, 'sat on' sound quality of Stevie Wonder's classic 'Superstition' the Akito offered a more open and clear rendition of the dated 'biscuit tin' drums in the recording than resolved by the sweeter, more genteel Ortofon TA-100 for example.

But it was swings and roundabouts, the Akito's flamboyance being to its detriment when it came to Stevie Ray Vaughan's electric guitar letting rip in 'Little Wing'. Here the more gentle balance of the Ortofon was preferable, although the Linn still sounded better controlled and all-of-a piece than the leaner Rega and Pro-Ject arms that lacked sufficient body to bring gravitas to the bass and drums. Furthermore the Akito was exhilarating.

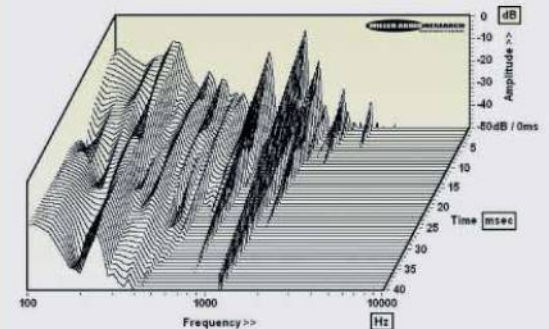
Sound Quality: 84%



ABOVE: Conventional design with anti-skate/bias compensation provided by a tension spring and dial, while the pillar can be raised/lowered in the arm collar to adjust VTA

## HI-FI NEWS LAB REPORT

This tried-and-tested tonearm puts in a solid performance, its slack-free bearings offering a minimal ~10mg friction in either plane while the downforce calibration errs slightly on the side of caution, delivering 10% more than indicated at 2g. The slotted headshell provides some modest adjustment of offset and overhang but its compact dimensions will suit shorter-bodied cartridges – deeper pick-ups may foul on the arm's exit pins. Two clear resonant modes are visible on the cumulative decay plot [see below], the main armtube bending at 230Hz and 1.2kHz with another series at 800Hz showing harmonics at 1.6kHz, 2.4kHz and 3.2kHz. Importantly, these modes are very well damped, falling by ~40dB over the 40msec window. PM



ABOVE: Cumulative resonant decay spectrum, 100Hz-10kHz

Bearing / bias type	In-line / internal spring
Effective mass / length	10g / 229mm
Offset angle / overhang	23 degrees / 18mm
Downforce accuracy (at 2g)	+10%
Cartridge weight/compliance range	3-10g / 10-18cu



ABOVE: Sturdy pressure die-cast headshell featuring a practical finger lift is pinned and glued to the Akito's straight-profile single-piece alloy arm pipe

# Ortofon TA-100 (£1000)

So new that at the time of writing it is yet to feature on this famous Danish manufacturer's website, the TA-100 harks back to a golden age of vinyl replay. We're informed there's also a 12in model (TA-200) due for release later this summer.

Depending on one's point of view, you'll consider it either rather old-fashioned or delightfully retro in design due to its S-shaped arm tube (23.9° offset angle) and detachable headshell. The latter is a variant of Ortofon's LH-2000 12g aluminium headshell, this one a tad heavier at 15.5g, Ortofon offering a range of alternative headshells in magnesium and even Urushi lacquered wood alongside various high purity copper and silver headshell leads with which tweekers may care to experiment.

Quality of finish is exemplary – redolent of SME's 3009 arms of yore – while the arm proved lovely to use with a delightful cueing action: you can simply flick down its long cue lever and let the gentle damping do the rest. Ortofon supplies an elaborate arm cable with the TA-100 called the 6NX-TSW1010, a 6N purity copper twin-shielded cable that is extraordinarily thick and stiff – and likely to prove awkward if fitting to suspended-chassis decks.

## ANALOGUE DELIGHTS

Sounding highly musical with delicate treble detail and a rich, powerful and infectiously tuneful bass, the TA-100 brought its own brand of rich and resonant colour to the test deck and system.

The multi-layered strands of Miles Davis' 'Tutu' were open and clear, the ringing of ride and crash cymbals lacking any sense of

electronic 'edge' while the deep bass synthesiser notes were clearly delineated and formidably vigorous.

The prevailing reggae bass line of Zappa's 'Lucille Has Messed My Mind Up' confirmed the arm's ability to pump out potent bass in metronomic fashion, with considerably more 'punch' and weight than delivered by the leaner but arguably cleaner Rega arm. While it didn't quite display the bass authority and clout of the SME Series IV it was mighty impressive nonetheless.

Reproduction of the Chicago SO's *Scheherazade* displayed the TA-100's ability to convey the exceptionally wide soundstage of the recording, with the strings spread out beyond the outside edges of the speakers.

A little more forgiving of surface noise than Linn's Akito, this Ortofon arm combined energy and power with a 'sweet' tonality that proved most endearing to these ears. The timbres of strings, woodwind and brass were vivid and expressive and with Stevie Wonder's 'Superstition' the sound remained open and uncluttered – with sparkling high frequencies. Punchy, staccato keyboards, energetic and crisp hi-hat sounds and joyously enthusiastic trumpet and saxophone... all were candidly and 'musically' exposed.

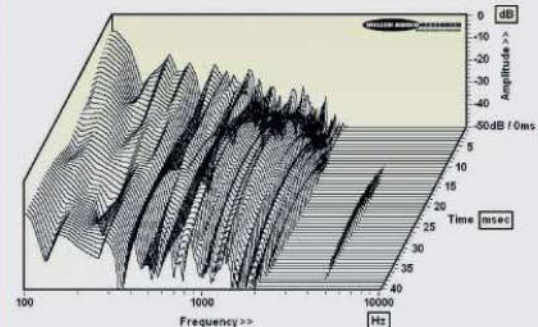
Sound Quality: 80%



ABOVE: Featuring an 18mm-diameter aluminium arm tube and zinc shaft, VTA adjustment is straightforward while anti-skating/bias is via a calibrated dial

## HI-FI NEWS LAB REPORT

Beautifully finished, certainly, but the performance of Ortofon's TA-100 is complex. The counterweight downforce calibration is accurate to -5% (2.0g delivers 1.9g) and friction is very low but there's clearly a hint of play in these gimbal bearings. The hazards of reviewing an early sample, no doubt. Nevertheless, combine this with a direct-coupled counterweight, an S-shaped arm tube and (heavy) detachable headshell and the lack of any clear, clean resonant modes [see modal waterfall, below] is explained [see also, p92]. Instead, the TA-100 offers a muddle of bending modes, albeit of low amplitude and generally low Q. Finally, at 14g this arm has the highest effective mass of any in our group – a natural for the classic low compliance MC. PM



ABOVE: Cumulative resonant decay spectrum, 100Hz-10kHz

Bearing / bias type	Gimbal / internal spring
Effective mass / length	14g / 231mm
Offset angle / overhang	24 degrees / 18.0mm
Downforce accuracy (at 2g)	-5%
Cartridge weight/compliance range	8-15g / 6-15cu



ABOVE: The detachable headshell might be unfashionable, but it affords delightfully easy cartridge fitting/swapping and experimentation with alternative headshells

# Pro-Ject 10cc Evolution (£1000)

Alongside its comprehensive range of turntables from budget to high-end, Pro-Ject of Austria also has several specialist tonearms in its portfolio. This 'Evolution' version of its 10cc 10in carbon fibre model features a substantially enlarged housing for its inverted bearing comprising four ABEC 7 specification ballraces, with superior high-purity copper internal wiring.

While it might look chunky it's actually a low mass arm thanks to its one-piece carbon fibre arm tube/headshell, and can be supplied fitted with a standard five-pole arm socket, a terminal with RCA sockets and earth screw, or flying leads for DIY-ers. Three counterweights are supplied with the arm suitable for cartridges weighing 4-14g, while optional counterweights are available to cater for heavyweight models up to 22g.

The counterweights are damped via an internal ring of Sorbothane and the counterweight shaft is lowered from the plane of the arm tube to aid tracking of record warps. Care is needed in operation however, for while the lift/lower mechanism proved highly accurate with zero drift, on our sample the silicone damping was inadequate, necessitating gentle manual lowering of the cueing lever.

## STARK RELIEF

As the vintage recording of the Chicago Symphony Orchestra's *Scheherazade* sounded immediately 'open' and three-dimensional, allowing microscopic observation of the tonality and placement of the instruments in fine detail, it soon became apparent that the 10cc

Evolution majored on delicacy rather than dynamic get-up-and-go.

It also proved a little unforgiving on our test deck, Stevie Ray Vaughan's 'Little Wing' sounding uncomfortably strident during crescendos. All was present and starkly correct, from the low-level buzzing of guitar amps and Stevie's finger vibrato, to Chris Layton's animated drum rolls and sizzling cymbals. Yet the sound was curiously 'mechanical', with cymbals sounding wispy, insubstantial and 'unreal'.

classic 'Superstition' confirmed that the while the sound was fast and spirited it could lack bass weight and power. Cymbals shimmered and sizzled, but failed to ring just as the pulsating, rhythmic bass playing of Arthur Barrow on the Frank Zappa track from the *Joe's Garage* LP was disappointingly lightweight. While not as soft-focused as with the Roksan arm, its notes stopping and starting with metronomic precision, the bass was still too lean.

This result contrasts with the far warmer performance obtained with the same arm mounted on Pro-Ject's own RPM 10.1 Evolution [HFN, May '10] and auditioned with the beefier Koetsu Black MC. Once again this illustrates that many arms are as fussy about the partnering deck as the cartridge they carry.

Sound Quality: 70%



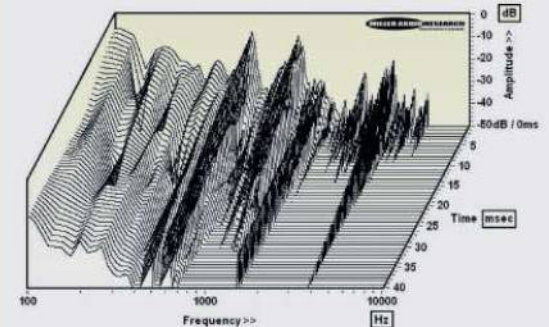
ABOVE: Single-piece carbon fibre arm tube, its conical profile designed to avoid standing wave reflections, morphs into headshell. Bias is via thread and weight



ABOVE: Purposeful design has substantial base with Linn/Rega mounting arrangement. VTA adjustment is offered while a single-point fixing affords azimuth adjustment too

## HI-FI NEWS LAB REPORT

Pro-Ject's four ABEC 7 tolerance ball races exhibit absolutely no play but still offer very low (<20mg) levels of friction. Despite its chunky appearance, the Evolution offers a slightly lower-than-average effective mass and is better suited to low weight/high compliance cartridges. Tested with its medium counterweight, the Evolution's downforce proved to read about 10% over the actual value, with an expected 2g measuring closer to 1.8g. If in doubt, overcompensate slightly. The lightweight but very rigid carbon fibre tube stores little energy through the bass (unlike the counterweight rig) and has a well defined arm break at 600Hz with harmonic at 1.2kHz [see spectrum, below]. The flat and very stiff carbon headshell 'cracks' sharply at a very high 4kHz. PM



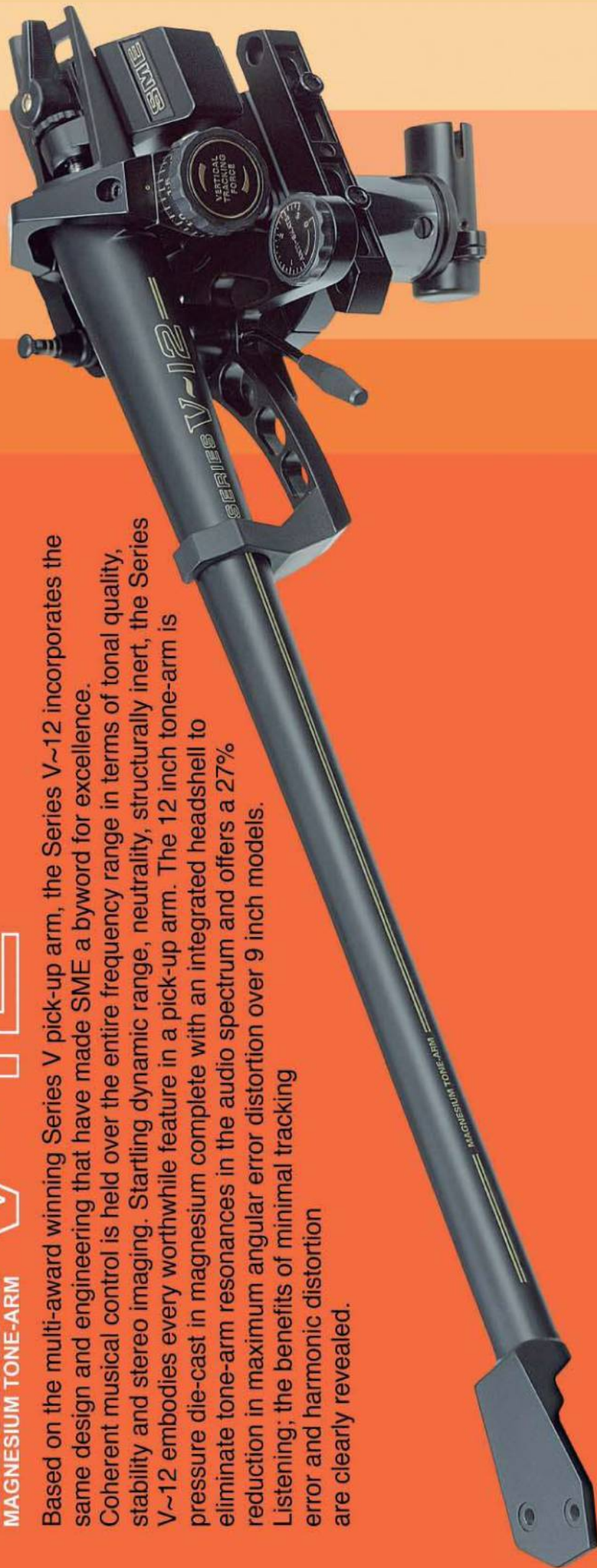
ABOVE: Cumulative resonant decay spectrum, 100Hz-10kHz

Bearing / bias type	Gimbal / thread-and-weight
Effective mass / length	9g / 254mm
Offset angle / overhang	23 degrees / 18mm
Downforce accuracy (at 2g)	-10%
Cartridge weight/compliance range	4-15g / 15-25cu

# SERIES V~12

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# Rega RB1000 (£1000)

During the 1970s Rega turntables were fitted with arms sourced from Japanese manufacturer Koshin that made arms under the Lustre and Acos brands. It was in 1983 that Rega produced its first 'RB' (Rega Britain) model, the critically acclaimed RB300.

What set the RB300 apart was its one-piece aluminium arm tube and headshell precision casting, a revolutionary manufacturing process at the time. Beautifully finished, the RB1000 is currently Rega's top model, with bearings ground to a tolerance of within five microns and the company claiming exacting quality control as each sample is hand assembled and tested.

Tracking force is set using a dial on the side of the bearing housing via a reverse spring assembly, so when set at 0g the spring is fully tensioned and effectively disconnected at settings of 3g and above. Anti-skating is applied magnetically, adjusted by sliding a plunger at the front of the arm rest fore and aft. The wiring is a continuous run from cartridge tags to phono plugs, the captive arm lead being Klotz cable fitted with Neutrik ProFi RCA connectors.

Regas are not the easiest arms to fit to (non-Rega) turntables as there is no height adjustment, but once installed this RB1000 proved lovely to use with a gently damped, accurate cueing action.

## **MEAN YET LEAN**

The dynamic recording of Miles Davis' 'Tutu' sounded fast and precise with the RB1000. Cymbals appeared sharp and clear and the trumpet truly rasped, with a



**ABOVE:** Single-piece arm tube and headshell with finger lift is highly-polished aluminium, with no coating applied in order to keep mass to a minimum

subjectively forward balance that added extra pizzazz to the musical presentation. Yet while exciting, vivid and explicit, the neutral tenor of the arm revealed the inherently lean character of the test deck.

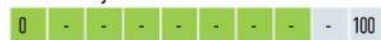
This was confirmed with Frank Zappa's 'Lucille Has Messed My Mind Up'. The vocal delivery was exceptionally clean and vivid and Vinnie Colaiuta's percussive embellishments highly explicit. But the rhythmic reggae beat of the bass line was lightweight compared to the more 'colourful' arms in our group. Indeed, only the considerably more expensive

SME Series IV offered the same insightful neutrality with an appropriately warmer bass register, bringing more 'oomph' to the music.

The orchestral recording of *Scheherazade* was brightly lit and certainly clear and detailed, however the forward balance added a touch of fatigue during loud passages. Brass fanfares were vigorously portrayed and the massed strings beautifully spread across the wide image of this recording, albeit adding little colour to the deck's confident neutrality.

This simple, rigid arm design is quite the opposite of the Roksan in-pivot. Where the Roksan will appear warm and opulent, the Rega is cool and analytical, if exceptionally detailed. Partner with care.

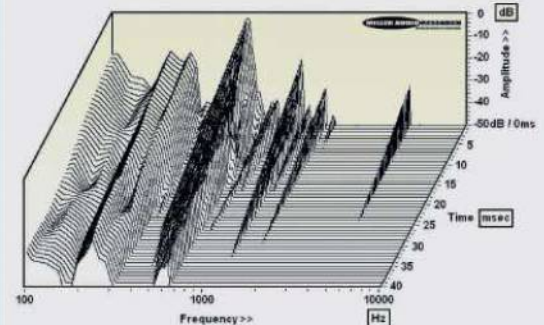
Sound Quality: 80%



**ABOVE:** Arm pillar and three-point collar fixing is formed from a single block of stainless steel. As there is no height adjustment, correct VTA must be achieved by using spacers

## **HI-FI NEWS LAB REPORT**

Top of Rega's tonearm tree, the RB1000 benefits from the brand's famous one-piece aluminium alloy tube, headshell, bearing and counterweight support, this time free of any powder-coat or anodised finish. Simplicity and robustness are traded for a certain lack of flexibility in setup, but the magnetic bias and spring-loaded downforce are accurate in use. Just forget any notion of easy VTA or other adjustment! The arm's freedom from artifact is reflected in the cumulative modal decay plot [below] which indicates a lack of stored LF energy. The substantial main beam shows a primary bending mode at 250Hz with a more vigorous mode at 600Hz and 2nd harmonic just off 1.2kHz. A 5kHz hoop or torsional mode is also just visible. **PM**



**ABOVE:** Cumulative resonant decay spectrum, 100Hz-10kHz

Bearing / bias type	In-line / magnetic
Effective mass / length	11g / 237mm
Offset angle / overhang	23 degrees / 15mm
Downforce accuracy (at 3g)	+5%
Cartridge weight/compliance range	5-12g / 8-22cu

# Roksan Nima (£490)

No strangers to the world of vinyl replay, Roksan Audio's first product was its acclaimed Xerxes turntable in 1985, soon followed by the Artemiz tonearm and Shiraz cartridge. This Nima model, with a stainless steel uni-pivot bearing, was first introduced in 2003 to accompany Roksan's entry-level Radius 5 turntable. More recently the Nima has undergone several upgrades including an improved pillar holder and custom made arm tube, the company boasting that today's Nima is meticulously hand assembled using ten precision machined components.

While the fixed cartridge wires exiting the arm at the headshell are standard fare, Roksan employs a flat printed circuit board cable to transmit the signal down the length of the arm tube. The price includes a shielded coaxial arm connector cable with gold plated five-pin plug and RCAs, while for a £150 premium a 'High Definition' cable upgrade is available using 'Van Damme' wire and sporting Roksan-branded Neutrik ProFi RCA plugs.

As with any uni-pivot design, correct setup is fiddly (especially with respect to azimuth) and you might not like the lack of a safety retaining clip on the armrest. The cueing device is pleasingly damped but some degree of drift hampers accurate cueing – a common occurrence with most uni-pivots.

**SIMPLY SUMPTUOUS**  
 Sounding full-bodied and deliciously 'analogue' in character with rather fat, plump bass [see Lab Report], Miles Davis' 'Tutu' track bristled with energy. The ripe bass wasn't

particularly detailed or descriptive of texture, appearing slow and overblown, nevertheless there was plenty of detail up the frequency scale affording good intelligibility to percussion and reverberation tails within the dense production.

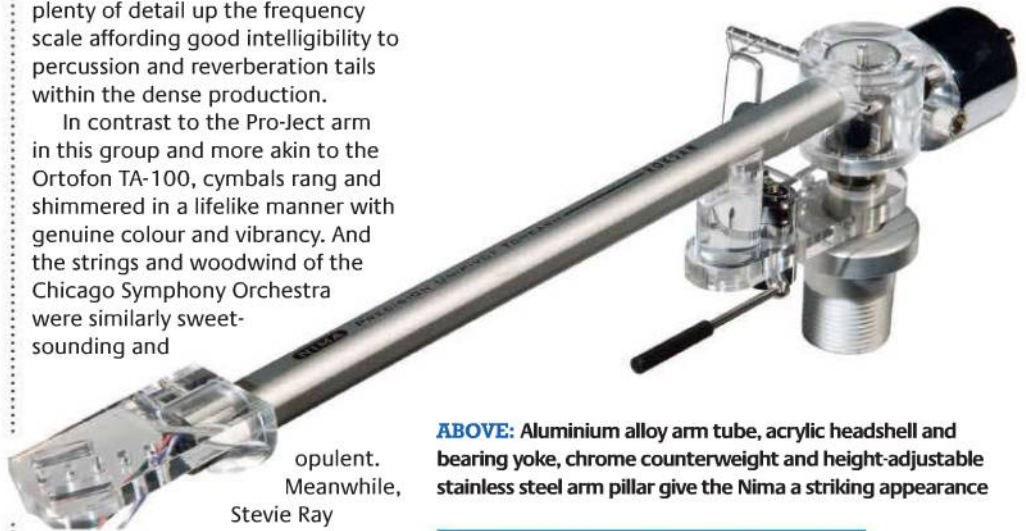
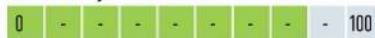
In contrast to the Pro-Ject arm in this group and more akin to the Ortofon TA-100, cymbals rang and shimmered in a lifelike manner with genuine colour and vibrancy. And the strings and woodwind of the Chicago Symphony Orchestra were similarly sweet-sounding and

opulent.  
 Meanwhile,  
 Stevie Ray

Vaughan's recording of 'Little Wing' remained fairly easy-on-the-ear even as he let rip during loud passages, the overall performance of the track being marred only by the cloying effect of the overly plush-sounding bass that hampered delineation between bass guitar and kick drum.

On 'Superstition' Stevie Wonder's vocal enjoyed uncommonly fine intelligibility, despite the fulsome bass having nothing like the depth, power and precision of Linn's Akito, never mind SME's Series IV. Swapping to Roksan's more costly 'High Definition' arm cable tightened the bass considerably and enhanced clarity of the percussive electronic keyboards. It increases the price to £640, but it's worth it.

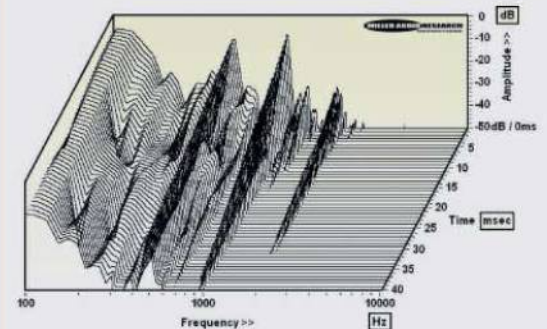
Sound Quality: 75%



ABOVE: Aluminium alloy arm tube, acrylic headshell and bearing yoke, chrome counterweight and height-adjustable stainless steel arm pillar give the Nima a striking appearance

## HI-FI NEWS LAB REPORT

As the only uni-pivot in our test, the Nima offers extremely low levels of friction (<10mg in either plane) and a ready adjustment of tilt angle but takes a practised hand to cue-up mid-way through a 12in LP. The stainless steel uni-pivot is positioned along the central axis of the arm tube while the counterweight is positioned below, approximately in the same plane as the stylus, in effort to improve the arm's stability. The cumulative resonant decay plot [below] indicates that Roksan's box-section alloy arm tube bends as low as 100Hz with other modes and harmonics at 500Hz, 1kHz and 2kHz. The sustained LF energy ties-in with JB's 'plush bass' and suggests that high compliance MMs are the better partners. PM



ABOVE: Cumulative resonant decay spectrum, 100Hz-10kHz



ABOVE: Anti-skating/bias is via thread and weight. The hole through the counterweight is offset, consequently rotating it alters cartridge azimuth

Bearing / bias type	Unipivot / thread-and-weight
Effective mass / length	11g / 240mm
Offset angle / overhang	23 degrees / 17.5mm
Downforce accuracy (at 2g)	Uncalibrated
Cartridge weight/compliance range	5-12g / 15-28cu

# SME Series IV (£1495)

While most tonearms fix the pivot point so you must move the cartridge in the headshell to set overhang, SME's system does the opposite. The cartridge's position is fixed in the headshell, while the arm's ingenious base slides fore and aft.

SME's precision engineering is legendary. Just to look at and feel this Series IV model – one step down from the flagship Series V which features ABEC 7 rather than ABEC 3 bearings together with on-the-fly VTA adjustment – is enough to see exactly why it costs what it costs. The attention to detail, fit and finish, are peerless – right down to the damped, swivelling output socket that provides easy 'dressing' of the supplied tonearm cable.

Made by SME using unpretentious plugs that nevertheless feature gold connector pins and sensible strain relievers, the cable is Van den Hul's D-501 Silver Hybrid, which is flexible and just 4mm in diameter. An extra £120 buys internal wiring with van den Hul MCS150 silver cable.

Accurate set up with SME's alignment protractor is simplicity itself. The arm is also a joy to use. The cueing device is precise in operation, with a smoothly damped action and no lateral drift.

## ROCK SOLID

Even in standard issue with 'regular' internal wiring the Series IV sets a benchmark against which all others must surely be judged. Yes, it's the most expensive tonearm in this group by a considerable margin, but from the opening bars of 'Superstition' it sounded like it in a most obvious fashion.



ABOVE: One-piece pressure die-cast tapered magnesium arm pipe is internally damped. Anti-skate/bias compensation is by a tension spring and calibrated dial

Bass power was truly visceral, the bass synth and kick drum combining depth and muscular energy in equal measure together with an ability to stop and start with commanding precision. Meanwhile, subtle details of multi-tracked keyboards and natural percussive sounds were resolved clearly, never swamped or clouded by the immensely powerful low frequency energy that was being delivered. The reggae bass beat of Frank Zappa's

'Lucille...' packed a vigorous punch with the SME in situ, the metronomic drumming of Vinnie Colaiuta ricocheting around the listening room as his sticks cracked against hi-hat and rims. The master tape-like stability of the performance was simply spellbinding.

Further exhilaration was in store when listening to Stevie Ray Vaughan's guitar playing. Displaying what seemed to be the finest attributes of the Linn and Ortofon arms, all rolled into one and enjoying an extra layer of detail and dynamics, the subtle phrasing and shading of the band's playing was mesmeric. Likewise, the stability of the sound image reproduced by *Scheherazade* transported the mind to Chicago's Orchestra Hall as the instruments came to life, proving just how fine a transducer the Ortofon Cadenza Blue is when provided such a stable platform.

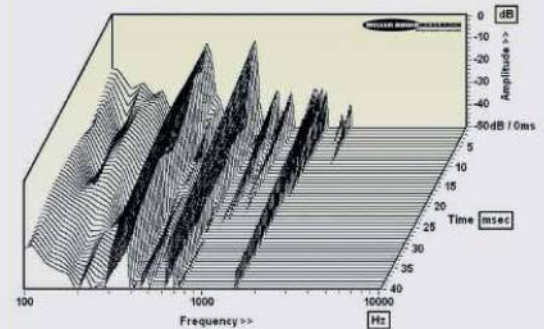
Sound Quality: 88%



ABOVE: Clamp bolts on the base release the arm for both horizontal and vertical adjustment. Underslung counterweight is a tungsten-alloy block suspended on a damped suspension

## HI-FI NEWS LAB REPORT

While the Series IV is structurally complex and heavy at 700g (an issue only with certain suspended subchassis turntables) its effective mass is a perfectly modest 11g and suited to a wide range of cartridge types. The key section of the arm – the headshell, tapered tube, bearing yoke and counterweight rail – are all fashioned from a single magnesium alloy die-casting. The lockable tungsten counterweight hangs below the plane of stylus and bearing as an aid to stability while the pre-loaded bearings offer almost zero friction and no detectable play. Despite its complexity, the IV benefits from a simple resonant behaviour [see modal waterfall, below], the tube bending at a relatively high 320Hz with a second mode at 600Hz. PM



ABOVE: Cumulative resonant decay spectrum, 100Hz-10kHz

Bearing / bias type	Gimbal / internal spring
Effective mass / length	11g / 240mm
Offset angle / overhang	23 degrees / 17.5mm
Downforce accuracy (at 2g)	+3%
Cartridge weight/compliance range	5-15g / 8-25cu

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# GROUP TEST VERDICT

• CD PLAYERS • TURNTABLES • CARTRIDGES • SPEAKERS • **TONEARMS** • HEADPHONES • INTERCONNECTS •

**A**s highlighted in the introduction to this group test on page 35, a record player is a balanced combination of the turntable, arm and cartridge – and it transpired that in the test rig the least satisfying was Pro-Ject's 10cc Evolution. While delivering bags of detail and sounding fast and delicate, its lean bass robbed the music of texture, sounding too analytical.

Roksan's Nima uni-pivot was quite, quite different. This had an endearingly warm, smooth, 'analogue sound' but was marred by an indistinct bass bloom that was soft and coloured. In a small-scale system with mini monitors this might go largely unnoticed. Also let's not forget that it's half the price of most of the arms here, so value is high.

## THE REST...

Rega's identically-priced RB1000 was similar in its matter-of-factness to the 10cc. It too was fast and detailed and was well on its way to sounding too stark and unforgiving on the equally uncolored Clearaudio test deck. But where clarity is judged ahead of warmth, the RB1000 proves very insightful on most decks.

While I observed marked differences in the way the Linn Akito and Ortofon TA-100 presented the music – the Linn sounding bold and forthright, the Ortofon sweeter

'Want to hear what's really on your records? Buy this...'

and more laidback – it was difficult to say which was 'better'. We've awarded them similar scores, demoting the Ortofon only slightly for its lush presentation and arguably somewhat less faithful

reproduction. Nevertheless, after almost three decades of spinning CDs and DVDs I've

become downright intolerant of the ticks and pops in my aged LP collection – and the Ortofon's gentler demeanour proved kinder to surface imperfections.

Certainly Linn's Akito is something of a bargain considering the performance it delivers. Having been surprised by how much better Roksan's Nima sounded with its more expensive 'High Definition' arm cable option, I spent a couple of days reinstalling some arms and mixing 'n' matching cables.

Linn's plastic-plugged cable was substituted with both the Roksan HD and Ortofon's expensive-looking cable, but I discovered that the Akito sounded best with the cable supplied, despite it appearing to be somewhat cheap fare.

## ...AND THE BEST

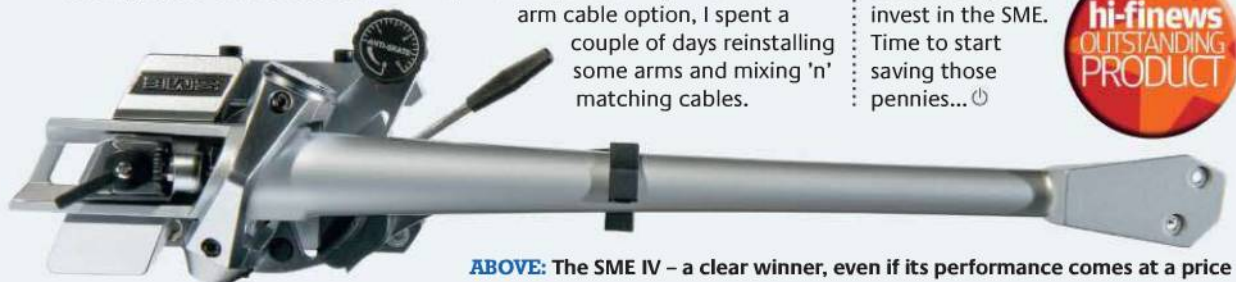
This leaves the considerably more expensive SME Series IV, which looks and feels like a fabulous example of precision engineering. This was the first time I've ever unboxed and installed one all on my lonesome and it proved an absolute doddle to fit and set up. Then I heard the sound. Detail? Fabulous. Transparency? You bet. Bass performance? Not only thunderous but solid.

If you want to hear what's really on your records and you can afford the high price ticket then you'll invest in the SME. Time to start saving those pennies... ⚡



**BELOW:** Linn Akito – utilitarian looks but vivid sound

**ABOVE:** Ortofon TA-100 – one sweet-sounding arm



**ABOVE:** The SME IV – a clear winner, even if its performance comes at a price

• CD PLAYERS • TURNTABLES • CARTRIDGES • SPEAKERS • **TONEARMS** • HEADPHONES • INTERCONNECTS •

# Cambridge Audio 650BD (£400)

The cost of a fully universal CD, SACD, DVD-A and DVD-compatible Blu-ray player has just been decimated – literally – thanks to the Audio Partnership's Cambridge crew  
 Review & Lab: **Paul Miller**

So far there's been no answer from Yamaha, Pioneer or Sony to the universal Blu-ray behemoths launched by Denon and Marantz. Since they were exclusively reviewed in *Hi-Fi News* [Oct '09 and Dec '09], the £4500 DVD-A1UD and £5000 UD9004 have only been joined by slightly cheaper variants from the same stable. Although Marantz's £2450 UD8004 could hardly be described as 'cheap'.

Instead, the first truly entry-level universal disc player has been launched from leftfield, from where no-one was looking – courtesy of the restless but hugely talented engineering team at Cambridge Audio. No less than the house brand of Richer Sounds [see boxout].

At first sight, the £400 Azur 650BD looks just like Cambridge's previous generation of DVD/BD players – slim, black and not especially elegant. Nevertheless at over 4kg its chassis is considerably beefier, the wraparound bonnet less resonant and the alloy fascia decidedly thicker. But this new Cambridge disc player has not just been pumping the iron, it's been at the books too.

## LOCK AND LOAD

Thanks to a two-part Mediatek processing solution, the Azur 650BD not only handles CD, DVD, DVD-A and SACD audio media but is also a fully paid-up Profile 2.0 Blu-ray player with just about the quickest BD loading times I've witnessed. The most tortuous of Java-based menus, typically beloved of Disney and Pixar animations, are seemingly loaded in a trice by the 650BD. Moreover, its memory and automatic resume facility allows almost any 5in disc to be ejected, re-loaded at a later date and playback picked-up where it was interrupted (with a five-disc limit).

**RIGHT:** Cambridge has equipped the 650BD with two USB 2.0 ports for external storage, one at the front the other at the rear. Supported audio files include PCM (WAV), WMA, WMA Pro and MP3 (but not AAC). AVI, WMV and MPEG2/4 movie file formats/codecs are also supported

In practice, the 650BD is compatible with commercial Blu-ray, DVD-V, DVD-A, SACD and CD (inc. HDCD) discs in addition to BD-R/RE, DVD±R/RW, CD-R/RW and Kodak Photo disc media. It also includes 1GB of internal memory which can be managed along with external 'persistent' storage via its USB ports to retain BonusView and BD-Live features after the player is switched off. Compatibility with every disc type (except HD-DVD, may it rest in pieces) is reinforced by on-board decoding of Master Audio and High Resolution Audio tiers of DTS-HD along with Dolby TrueHD via its 7.1 analogue output channels.

SACD's DSD code is also processed and/or routed via HDMI in the same transparent fashion as Dolby/DTS HD bitstreams. However, within the player, DSD is downsampled to 88.2kHz LPCM before conversion to analogue audio, a 'corruption' of SACD's bitstream that's avoided in both of the two heavyweight universal players from Denon and Marantz. Don't confuse this with the 'SACD Output Mode' (PCM or DSD) available from the 650BD's Audio Format menu as this refers to the HDMI stream, and not what is actually converted to audio within the player itself.

Nevertheless, due deference to the audiophile is illustrated by Cambridge's 'Pure Audio' mode which defeats the player's internal video processing when playing back audio media of any type. However, as HDMI audio still requires a video clock by way of synchronisation it would be rather pointless switching it off altogether – instead Cambridge outputs black/inactive video frames while retaining the sync clock. The new vacuum fluorescent display is also muted in Pure Audio mode, the blue window instantly reinstated at the touch of any button on the matching RC-650BD remote [see picture, p48].

## NEW NAVIGATION

Previous Cambridge DVD/BD players have featured reasonably primitive on-screen setup menus, but the Azur 650BD offers an intuitive GUI that's firmly removed from the technological Stone Age. Sure, it's not as colourful or comprehensive as the icon-driven encyclopedia behind the Denon/Marantz players, but then neither is it so damn' confusing.

All its video, audio and device setup menus are text-based and readily accessible, Cambridge saving its one big





graphically-driven menu for the speaker setup page. This allows each of its 7.1 channels to be viewed simultaneously, with large, small or 'off' speaker icons complete with individual level and distance settings. The crossover frequency, rather than being user-defined, is fixed at 80Hz (the THX default) for all bass management operations between small speaker channels and the LFE effects (sub) channel.

This is a minor concession to price, in my opinion, as the major saving has come from utilising the all-in-one Mediatek MTK8520/MTK8575 DSP for audio/video processing in place of big ticket silicon from Gennum or Silicon Optix, for example. Not that the Azur 650BD is short of video scaling options via HDMI, offering everything from 576i/480i PAL/NTSC all the way up to 1080p at the 24Hz film rate and 50/60Hz video rates.

Extra resource has been spent on the 650BD's audio section, however, which employs separate CS4345 and CS4361 DACs – both from Crystal and each 24-bit/192kHz capable – for the main two-channel and additional 5.1 channel outputs, respectively. Similarly, the entire 7.1 channel analogue output features a

bespoke preamp section driven from, not a switchmode, but a heavyweight linear power supply.

### OUT OF THE BOX

It does not take hours of auditioning to appreciate that the Azur 650BD has been 'voiced' by audio- rather than out-and-out home cine-philes, such is its silky-smooth and insightfully detailed performance. This is no bad thing in my view, for if a player can reproduce two and multichannel music with convincing subtlety then you're almost guaranteed that the orchestral score and dialogue from modern movie BDs will be rendered with similar sensitivity, regardless of the intensity of any accompanying effects.

True to form, the Azur 650BD maintained the unusually delicate, almost piquant musical flavour of Disney's *Up* with the same assuredness that it delivered the action and effects that would come thick and fast throughout the latest

**ABOVE:** The smattering of logos pay testament to the 650BD's 'universality' which encompasses every audio disc format except the defunct HD-DVD. Even CD's HDCD variant is accommodated

're-imagining' of the *Star Trek* saga. Sure enough there is not quite the wallop or sense of grand scale thrust into the room by the high-end hierarchy of Marantz and Denon, but the 'smaller', more measured

and arguably more cautious sound of the 650BD is still perfectly formed.


Never was this more obvious than with the high resolution 5.1 channel DTS-HD audio option from Deep Purple's *Live At Montreux*

'The percussion danced like a swarm of fireflies in the gloom'

2006 [ERBRD5008]. (This disc requires a BD player that either decodes DTS-HD or passes it over HDMI to a compatible AV amp because the default LPCM audio option is two-channel only.)

### SMOKIN' IN MONTREUX

This is a performance that demands to be played loud if classic tracks including 'Strange Kind Of Woman', 'Space Truckin', 'Highway Star' and, of course, the tale of how it all began – 'Smoke On The Water' – are to be revealed in all their colourful and energetic glory. Too quiet and the performance can collapse in on itself sounding slightly moribund and compressed, but at high levels it comes alive as the unmistakable tenor of Don Airey's keyboards and Steve Morse's guitar tear into the night and over the waters of Lake Geneva.

On the one hand I was still left wondering what difference the original band members Jon Lord and Ritchie Blackmore, respectively, would have made to the 'feel' of this event while on the other I was left in sneaking admiration for the manner in which the 650BD was holding this difficult live recording together. So often it can sound ragged, 

## THE CAMBRIDGE CONUNDRUM

Cambridge Audio, as a brand, has had a long and varied history. From its inception back in 1968, through the '70s and '80s it was known for the slimline P40, P50 and P60 integrated amplifiers. Then, in the early days of CD, Cambridge reached a high point with the now-iconic CD1, a two/three-box player that included switchable analogue filters and a 'Quality Assurance' module that gave a visual indication of the CD error rate. In fact it's only over the last 16 years, the Cambridge name being bought by the The Audio Partnership in 1994, that it's become associated as the house and essentially 'budget' brand of Richer Sounds.

Ironically it's the economies of scale offered by this group with its 25-strong team of engineers in London and bespoke manufacturing facility in China that keeps the marque so, well, affordable. Elsewhere in Europe (Cambridge is a net exporter) its products sell for a premium while, in the UK, many of its separates are relatively under-valued simply because of the Richer heritage. Its DACMagic outboard converter [*HFN*, Feb '09] which offers switchable digital inputs, digital filters and balanced (XLR) analogue outputs and state-of-the-art performance for just £230 is a well-documented case in point. Time will tell whether the 650BD has a similar impact.

## UNIVERSAL PLAYER



**ABOVE:** A full 7.1 channel analogue outputs are joined by composite/S-video and component video, coaxial/optical S/PDIF digital audio, HDMI 1.3c digital video/multichannel audio, USB and Ethernet (BD Live) sockets

lacking transparency or convincing bite, but the Azur 650BD exerted its composing influence to great effect here. Of course, offer the 650BD a disc that's been recorded under more idealised conditions – like the fabulous Japanese NHK BD release from the Saito Kinen Festival, and the civilised clarity, the see-through transparency and subtle detailing possible from the 650BD is revealed in an instant.

The 5.0 channel 24-bit/96kHz audio layer of Berlioz's *Symphonie Fantastique Op 14* [NSBS-13457] sparkles through this player even if the tumultuous 'Passions' does cause the 650BD to harden slightly, its customary poise distracted by the massed violins that vent their considerable energy towards the conclusion of the first movement. Nevertheless the spacious acoustic of the venue, captured with two arrays of DPA4006 microphones (LCR and LsRs) spaced 4.5m apart, is well represented by the player. I've heard the orchestra sound slightly more vivid and the acoustics benefit from a greater sense of height, but not at £400...

### DANCE OF THE FIREFLIES

Another example of the 650BD's ability to craft a decent sense of acoustic is revealed by the Telarc SACD of Jennifer Higdon's *City Scape – Concerto For Orchestra* [SACD-60620] recorded at the Woodruff Arts Centre with the Atlanta Symphony Orchestra. The percussive sequence dances like a swarm of fireflies in the gloom of the hall with bells, chimes and blocks also gently underscored by the orchestra – a fresh and flighty sound only grounded by the tympani which sounds just a little too fat through the 650BD.

My choice of two-channel CDs included favourites from Dire Straits and Chris Rea but most revealing

was Michael Hedges' *Live On The Double Planet* [Windham Hill 371066], the resonant bass and biting edge of his guitar instantly recognisable even if the player still exercised its now familiar caution, suppressing the last hint of exuberance from the thrust of his finger-picking for fear it should overstretch its capabilities.

Vocal 'classics' including Rickie Lee Jones' eponymous CD [Warner 3296] still sound as rich and dark as ever, especially tracks like 'Easy Money' and 'Chuck E's In Love' whose liquid honey seeps from the 650BD with the sweet conviction of the best standalone CD players at this price. Of course, there are precious few new CD players being produced below £500, so the feature-packed Azur 650BD is hardly facing an insurmountable wall of competition...

One thing you could never accuse the 650BD of is sounding harsh from playing too fast and loose. Frankly the player is engineered to stick within its limits, delivering a good 90% of the body and resolution offered by the Marantz and Denon universal BD hierarchy, for a similar financial saving. ☺

### HI-FI NEWS VERDICT

You don't get the bottom-end punch of the Marantz UD9004 or quite the sense of scale rendered by the DVD-A1UD from Denon, but for a tenth the price the 650BD provides a perfectly 'wholesome' and craftily-balanced alternative without serious flaw in any key area of performance. In this age of increasing belt-tightening, Cambridge is offering a couple of extra holes – so what are you waiting for?

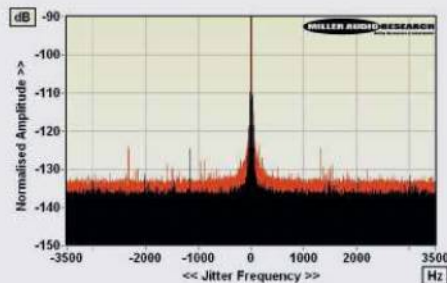
Sound Quality: 80%



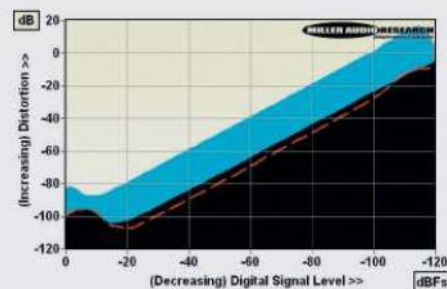
## CAMBRIDGE AUDIO 650BD (£400)

Unlike the £4000-£5000 universal BD players, this diminutive Azur 650BD has single-ended rather than balanced outputs, offers a lower (but perfectly standard) 2.1V output, a slightly weaker 103.5dB A-wtd S/N ratio and higher distortion at 0.0045% (1kHz) and 0.0095% (20kHz). This is hardly 'high' of course and even falls over the top 10-20dB of its dynamic range to as low as 0.00065% [see Graph 2, below]. More importantly, Cambridge's digital engineering has endowed the 650BD with a lower jitter than its costlier counterparts – 305psec with 16-bit CD and 230psec with 48kHz/24-bit DVD/BD, falling to 25psec with SACD and just 15psec with 96kHz/24-bit DVD/BD [see Graph 1, below].

SACD's full bandwidth is not realised, however, because the DSD stream is downsampled to 88.2kHz LPCM, limiting the response to -6.6dB/40kHz. The other responses are textbook: reaching -0.2dB/20kHz for CD and 48kHz DVD/BD before stretching out to +0.65dB/45kHz with 96kHz DVD/BD and -2.0dB/88kHz with 192kHz DVD-A. Channel crosstalk is very low at -110dB (1kHz). Bass management operates correctly with content from 'Small' channels mixed into the sub output, but this goes slightly awry if the sub channel is defeated, causing distortion on the front L/R. My advice? Keep the sub channel 'On' even if you don't own a sub. Readers may view the full gamut of CD, SACD, DVD-A and BD (including bass management) QC Suite test reports for the Cambridge Audio Azur 650BD universal player by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** High resolution jitter spectra comparing 48kHz/24-bit data (black spectrum) with 96kHz/24-bit data (red spectrum) from DVD/BD



**ABOVE:** Distortion vs. digital level over a 120dB range. 16-bit CD data (1kHz, black and 20kHz, blue) vs 24-bit DVD/BD data at 1kHz (red, dashed)

### HI-FI NEWS SPECIFICATIONS

Maximum Output Level/Impedance	2.19Vrms / 315ohm
A-wtd S/N Ratio	103.5dB
Distortion (1kHz, 0dBFS/-30dBFS)	0.0036% / 0.0040%
Distortion & Noise (20kHz, 0dBFS)	0.0095%
Freq. resp. (CD, 20kHz/SACD, 40kHz)	+0.0dB to -0.22dB/-6.6dB
Digital jitter (CD/SACD/24-bit BD)	305psec/25psec/230psec
Resolution @ -120dB (24-bit/48kHz)	±0.1dB
Power consumption	15W
Dimensions (WHD)	430x85x312mm



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# Luxman C-600/M-600 (£5995 each)

Luxman's pre/power combination marries macho Class-A, balanced operation and remote control for a heady taste of bang-up-to-date solid-state excellence

Review: **Ken Kessler** Lab: **Paul Miller**

Savouring the two models gracing these pages is almost a retro experience if you know Luxman of yore: it always was a classy company. The best way to describe it to those of you who don't recall the days when it made things like huge vacuum hold-down turntables, is to liken it to Lexus: just as Lexus is what 'Japan Inc' delivered when it wanted to take on the Germans (beating them, by the way, for reliability), so, too, did Luxman in the past reveal to the world that the Japanese could operate convincingly in the sector above Aiwa and Akai.

With the C-600f preamplifier and the M-600A stereo power amplifiers, Luxman has delivered its interpretation of current generation solid-state excellence, but without the tears. And although these are not even the top models in the series, if you didn't see the badge, you might for a moment think they came from Esoteric or Accuphase. Yes, they're that well-made, cleanly styled, intelligently appointed. It is a case – rare, I know – of a brace of £5995 price tags *not* being accompanied by any sensation of rip-off chicanery. These *look* like big money, yet without anything vulgar to suggest bling-bling.

That's another of Luxman's party tricks: they always adhered not to Japanese industrial (as opposed to architectural or horticultural) aesthetics but to the pure, Teutonic ideals of Bauhaus. This stuff is so cleanly attired, the controls and displays so wholly discrete, that you're forgiven for thinking that the minimalism extends to the functionality. Not so. For such uncluttered equipment, the pair justifies a remote control with 22 commands.

Dealing first with the power amp, the choices it proffers are balanced or single-ended operation, the option of

converting it into a bridged monoblock of up to a specified 120W into 8ohms, plus a couple of neat touches on the back. Like all new Lux products, an indicator tells you with the press of a button if your mains polarity is correct. Another rear panel delight is a quartet of the largest speaker terminals I've ever seen, a nod to those who like their terminals *tight*, but with an aperture for banana plugs.

Installing this was simply a case of leaving it with space to breath, and with a support, if not placed on the floor, able to cope with its aforementioned heft and relatively compact dimensions of 440x189x420mm (whd). I used it in balanced mode, connected to the C-600f with balanced cables from Yter.

## THE PREAMP..

The C-600f, meanwhile, measures 440x117x407mm (whd) and can accept two balanced sources, five unbalanced, tape in/out via RCA phonos, and two sets of main outs, both available in balanced or unbalanced mode. Also fitted to the rear are on/off triggers, the

mains polarity tester and an earthing post. Both units show clean faces to the world. The power amp has LEDs to indicate standby, balanced operation and bridged mode, with buttons to select balanced mode or to dim the display, but I would guess you won't use the latter when you see how captivating is Luxman's method of indicating power levels: lights glow from the sides of the square panel, increasing or decreasing in height according to the power.

More conventional is the preamp's display, with text readouts to indicate source, volume settings and other operational modes, including things like user-established presets for tone and balance, accessible via the remote.

Source and volume are operated through rotary controls, while small buttons select power on, tape monitor, balanced output mode and balanced inversion. While I did use the two products in single-ended mode, both together and with other components including the Audio Research Ref 5 preamp, Quad II-eighty monoblocks, John Howes-modified Quad IIs and



**RIGHT:** Informative display shows source, volume level, choice of balanced or single-ended output mode, balanced inversion and whether or not tone controls are in use



the McIntosh C220/MC2102 pre/power amps, all of the serious listening and concomitant comments refer to balanced. Simply put, unless you're buying just one of these components to use with a favourite preamp or power amp without balanced capability, you'd have to be a masochist *not* to use balanced throughout.

### A NEW EXPERIENCE

What followed was an object lesson in why specifications don't tell the whole story [see Lab Report]. No matter which speakers I partnered to what is rated as a 'mere' 30W/channel amplifier, Luxman's M-600A stereo power amp, driven in balanced mode by the matching C-600F preamplifier, acted subjectively like

its weight rather than what its power rating suggested. Merely schlepping this 26.5kg amplifier into my listening room implied the behaviour of something beefy. With both the Nola Micro Grand Reference, which can seem seriously, if not terminally, hungry in attitude, and their obverse, the Wilson Sophia 2s, which eat sparingly yet have no trouble whatsoever rising to occasions when plenty of grunt is present, the Luxman displayed the air of the *menefreghista*.

It was an ideal opportunity to enjoy the newly re-packaged edition of Jimi Hendrix's *Are You Experienced*, no sonic change from the previous CD save for a DVD extra. But who needs an excuse to hear 'The Wind Cries Mary'? What always seems to separate the good from the

**ABOVE: Stacking not recommended due to Class-A heat generation, but the two look great this way! Amp LEDs indicate standby, balanced operation and bridged status**

great is the airiness on the right channel percussion, a silky wash that favours tube playback. As open as you could want, the performance has a sense of space that – even though you know it's an artificial, studio-bound soundfield – inescapably rendered speakers invisible. The effect was as if conventional enclosures had suddenly acquired panel form and dispersion characteristics.

Be that as it may, the open terrain, the spacious stage which seemed to have had its boundaries extended, was far from the system's greatest virtue. That it was, like all well-designed solid-state hardware of no evident compromise, ghostly silent, with those black velvet backgrounds against which to present the sounds, is almost a given. The Luxman combination does such a sterling job with transparency that I was able to discern layering even with mono recordings, like the take of 'Piggies' from The Beatles' *White Album*. The cello/harpichord (or is that harmonium?) 'rhythm section' was as easily, aurally dismantled as with the stereo set.

Vocals were an area where I expected negatives to emerge. Perhaps I'd

### JACK OF ALL TOPOLOGIES

For the past few years, Luxman – quietly – has been rebuilding a reputation of which some readers might not be aware. Luxman was, along with Accuphase and Denon, one of the first Japanese brands to take on the Western high-end with genuine success. Highly covetable, beautifully designed – that applies to not a few brands. But Luxman always stood out because of something few others emulate: it excelled in more than one discipline. After a few years with an almost subterraneanly-low profile, we're now seeing analogue and digital, integrated and separate, all-solid-state, solid-state Class-A, all-valve, valve/solid-state hybrid, ultra-modern products, 'funky retro' amplification *and* source components. It's as if they've never been away. But maybe we shouldn't hold our collective breath for the return of the vacuum suck-down turntable.

## PRE/POWER AMPLIFIER

### LUXMAN C-600/M-600A (£5995 each)



**ABOVE:** Faultless ingress/egress for both, with superbly made connectors, XLRs for balanced, indication of AC mains polarity, and, on M-600A, huge speaker terminals. Remote covers every function, including preset access

experience a dearth of warmth, maybe a trace of sibilance. Nope – Alicia Keys’ prodigious talents were amplified, her ode to New York possessing a poignancy that proves far more elusive in other systems. And while in no way detrimental to the overall performance – I’ve even savoured this classic on an iPod – the experience is strengthened by a new intimacy. Which is, after all, what a good system should convey when intimacy is appropriate.

### SHEER MASS

Not so with ZZ Top, unless you feel the need to be scratched by someone else’s beard. What drove me to one of their greatest hits packages was a desire to feel the mass of ‘Gimme All Your Lovin’’. And it was here that I learned not to worry about the aforementioned wattage.

The Luxman power amp... I don’t want to upset collectors or hardcore anachrophiles, but this amp made me think the clock had been turned back 25 years or so and I was listening to a small, genuine Class-A Krell. I remember back then being taught lessons about 50-watters which thought they had an extra ‘0’ appended to their power rating.

The Luxman emulates that with astonishing efficacy. It goes loud, with the Sophias betraying no signs of compression nor of tweeter-killing distortion. Don’t get me wrong: this is not an

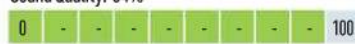
animal, like one of those gigantic Gryphons or the new darTZeel or one of those Musical Fidelity amps that make your lights dim momentarily when you switch them on. But the sheer mass the Luxman added to the airplane flying past in The Beatles’ ‘Back In The USSR’ contained bass weight more in keeping with a Blu-ray of *Battlestar Galactica*: it was as if the M-600A came with a sub.

For me, however, everything is about voice, and for this I make no apologies. But its success with Ms Keys led me to the Judds, whose harmonies on ‘Don’t Be Cruel’ are so clear, finely-meshed and seductive that even the near *a capella*-ness of the performance doesn’t lessen the challenge. The Luxman put them in the room. You could hear mother and daughter filling their lungs. ☺

### HI-FI NEWS VERDICT

More than any pre/power pairing I’ve used of late, these actually sound the most like each other: you’d be hard-pressed to suggest that one dominates the other in establishing the character of the performance. So, while both proved fascinating partnered with other makes, they deserve each other to deliver their best. And their best is a marriage of detail and warmth reminiscent of a Krell KSA-50. Truly delicious.

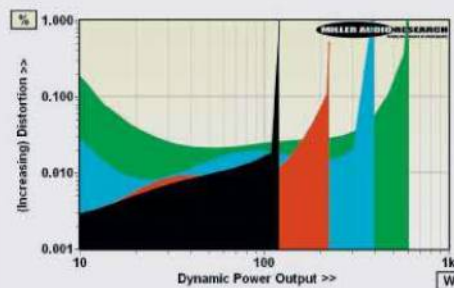
Sound Quality: 84%



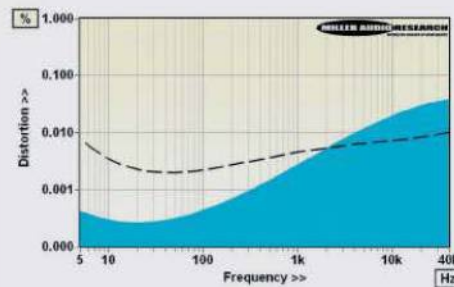
‘Specifications don’t tell the whole story’ says Ken at the outset of his listening notes. But then he was looking at Luxman’s specification of 30W for the M-600. In practice this power amp offers around 30W/8ohm in Class A but then continues on to deliver 2x115W/8ohm and 2x200W/4ohm in Class AB with a dynamic capacity of 380W/2ohm and 590W/1ohm [see Graph 1, below]. So if the C-600/M-600 sounds a lot more powerful than Luxman’s specs suggest, then that’s because it *is*.

Power consumption drops from 390W to 265W in the first hour of use during which time the M-600’s distortion increases from 0.0018% to 0.0028% (1kHz/10W/8ohm). Distortion increases with both power output (0.001% at 1W to 0.017% at 100W) and frequency (0.0002% at 20Hz to 0.03% at 20kHz) – trends that are reflected in the C-600 preamp where distortion increases from 0.0018% at 200mV to 0.04% at 7500mV out. Unusually, (2nd/3rd harmonic) distortion is slightly higher through bass and midrange frequencies than via the power amp [see Graph 2, below] but the responses are very similar (+0.0dB to -3.9dB and +0.0dB to -3.1dB from 20Hz-100kHz). The C-600’s balanced output impedance is a little higher than anticipated at 287ohm but the A-wtd S/N ratio is impressively wide at 96.2dB (re. 0dBV) and channel separation better than 75dB across the audio range. The C-600 also offers a 10V input overload margin with a maximum balanced output of 11V.

Readers are invited to view comprehensive QC Suite test reports for Luxman’s C-600 preamp and M-600 power amp by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red ‘download’ button. PM



**ABOVE:** Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads.



**ABOVE:** Distortion vs. frequency from 5Hz to 40kHz for M-600 at 10W/8ohm (blue trace) vs. C-600 preamp at 0dBV/60kohm (black, dashed trace)

### HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	115W / 200W
Dynamic power (<1% THD, 8/4/2/1ohm)	120W / 225W / 380W / 590W
Output impedance (20Hz-20kHz)	0.030-0.075ohm
Freq. resp. (pre/power, 20Hz-100kHz)	+0.0 to -3.9dB / +0.0 to -3.1dB
Input sensitivity (pre/power)	267mV (0dBV) / 102mV (0dBW)
A-wtd S/N ratio (pre/power)	96.2dB (0dBV) / 83.9dB (0dBW)
Distortion (pre/power, 20Hz-20kHz)	0.002-0.008% / 0.0002-0.03%
Power consumption (Idle/Rated o/p)	265W / 315W (4W standby)
Dimensions (WHD, pre/power)	440x117x407 / 440x189x420mm

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# Naim CDX2/DAC (£3390/£1995)

It's been a long time coming, but Naim has finally unveiled its first standalone DAC, able to improve the performance of its CDX2 and promising zero jitter, to boot  
Review: **Keith Howard** Lab: **Paul Miller**

**F**rom almost anybody else, the launch of a new outboard DAC would rate as one of the audio industry's more mundane events. But a DAC from Naim Audio – called, yes, the Naim DAC – is a development of more moment. Not so much for what it is but because it unravels what was, until now, one of the marque's design dogmas.

Naim was late to the digital audio party, launching its first CD player in 1991, almost a decade after Compact Disc's arrival. Even then, it idiosyncratically refused to equip its silver disc spinners with digital outputs, on the basis that a one-box solution – disc mechanism and digital-to-analogue converter circuitry combined – will always give better sound than a two-box one, where the disc reading and conversion functions are physically separated. Naim had a point in that difficulties do indeed arise with recovering the master clock from 'embedded clock' interfaces like S/PDIF and AES/EBU. But while Naim declared the problem insuperable, others in the audio industry knuckled down and, by various means, overcame it.

## THE SALISBURY SOLUTION

Only now has Naim felt it appropriate to follow suit but that's not to say that the Naim DAC is by any means a me-too product – it manifestly is not. Naim has developed its own solution to the S/PDIF jitter issue, comprising a buffer memory and switchable fixed-frequency master oscillators which are alternated in order to match, on average, the input data rate. It has also deployed optical data couplers within to provide ground isolation, opted for 40-bit floating point processing rather than the more usual 32-bit to ensure sufficient accuracy with 24-bit source material, and chosen to use an IIR rather than FIR digital filter because the reduced computational load was found to benefit

**RIGHT:** The CDX2's curved disc drawer opens manually, by pulling on what looks like a rotary switch knob. A small magnetic puck locates over the mechanism centre spindle to clamp the disc

the sound, even when the filters' amplitude and phase responses were identical.

Of course, Naim's digital source components have had to be upgraded to incorporate S/PDIF output. Here too an unusual approach is taken in that the S/PDIF circuitry is disabled when the player's own analogue output stages are enabled. This doesn't just mean that the digital outputs are switched off: power is removed from the S/PDIF modulator to prevent it radiating radio frequency interference. AES/EBU balanced digital interconnection is not supported, by the way, on the basis that its higher voltage only exacerbates RF interference issues.

Although the DAC has USB inputs front and rear, these are for the connection of a memory stick or iPod/iPhone, not for the streaming of audio from a computer. A FireWire interface is eschewed too, so if you want to couple the Naim DAC to a computer for hard disk replay it will need to have S/PDIF output.

This restricted range of digital interfaces apart, the Naim DAC appears much like any other outboard DAC. Four S/PDIF inputs

are provided, via Toslink optical or coaxial inputs, and are selectable via front panel buttons. Remote control input and output sockets are also provided. Two of the coax digital inputs are on 75ohm BNC sockets, the other two on phonos. A front panel LED indicates digital lock, while a second labelled 'hd' indicates that the input sampling rate is higher than 48kHz.

## TIME TO SWITCH

There are, though, two slide switches on the rear panel that are out of the ordinary. The first selects whether the analogue signal appears on the DIN or phono output sockets; the second, labelled chassis/floating, determines whether the audio circuitry is connected to earth internally or via the components to which it is connected. The choice can have a significant effect on sound quality, so it's worth taking time to determine which gives the best result. In my system, with the DAC connected to a passive preamp incorporating a DACT stepped attenuator and thence to a pair of Exposure XVIII Mono power amplifiers, I preferred





the floating setting, just as I did when reviewing Naim's HDX hard disk player in *HFN* December 2009.

The only other unusual feature – although familiar from other Naim equipment – is the multi-pin connector on the back panel via which the optional XPS external power supply (£2995) is connected (the costlier 555 PS is not compatible with the DAC). An XPS was provided for this review to assess its effect, as was Naim's mid-range CDX2 CD player (£3390) to determine the benefit of hooking the DAC up to it. To assess the Naim DAC with high sampling rate material, I used the S/PDIF outputs of a Prism Sound Orpheus FireWire audio interface, fed by a Mac Mini running Windows XP and the Foobar audio player.

### LOST IN MUSIC

I don't know about you but every now and then I trawl my music collection for items that have slipped the memory. Occasionally I even turn up a CD that, somehow, I've simply never played. Which is precisely how I came to use Arcadi Volodos' performance of Schubert solo piano works [Sony SICC 70, Japanese import] as the first piece for formal comparison of the CDX2 and CDX2/DAC. What a fool I've been to let this

disc languish so long: within the first few bars of playing it, initially via the CDX2/DAC combination, I knew it to be the best piano recording I have, and very probably the best I've ever heard. The sound is weightily dynamic but also delicate as required, spacious but with no sense of subtle timbral details being clouded in reverberant fog. I'm not the greatest fan of solo piano music, let alone Schubert, but I was riveted from the start. That, in a sentence, is what great hi-fi is all about.

Before comparing the sound via the CDX2 alone, I was careful to heed advice to power up its analogue output stage and 'work' it for some time prior to listening, which I did by connecting the analogue outputs to the passive preamp, turning the volume right down and playing a disc on repeat for the better part of two days.

Even after taking this trouble, though, the sound of the CDX2 alone was thoroughly eclipsed by the addition of the DAC. The CDX2 is a fine CD player, no question, but that's how it sounded: like a CD player. A little mechanical in its music making, a little hard on fortés, a little lacking in overall ease. With the DAC

'I'm not the greatest fan of solo piano music, but I was riveted...'

**ABOVE:** Naim insists that users shouldn't stack components like this, however tempting it seems, but instead use them either side by side or on the shelves of an equipment rack.

in circuit, by comparison, I could have been persuaded that I was listening to a hi-res recording. The music had a difficult to describe but easy to identify flow to it that was missing previously, the dynamic contrasts were greater, and there was no sense of the instrumental sound hardening and congesting on climaxes. All told the sound was significantly closer to that of a real piano, and the quality of both playing and recording shone through. Magical.

### FREE AT LAST

From the sublime to the ridiculous? No, but the next track I tried – Free's 'I'll Be Creepin' from the *Molten Gold* anthology [Island CRNCD 2 518 456-2] – was certainly a contrast, and not just musically. Nobody would call this an audiophile recording for a start, although even given its notably left-right mix it's better than many a rock recording of the era. I hadn't expected the contrast between CDX2 and CDX2/DAC to be quite so apparent with this second rediscovery from my disc trawl but I was dead wrong – if anything, the contrasts were greater.

Immediately noticeable was the flatter imaging of the CDX2, which gave relatively little sense either of overall depth or of space around individual elements in the mix. With the DAC in circuit the sound was much more expansive, and not just spatially but dynamically and rhythmically too. You could really believe that this was close to the sound of the master tape. No, this is no demonstration piece but how I wish that the still wet behind the ears younger me could have heard Free recordings ☺

### SELLS & NILSSON FILTER

Named after two of its highest-flying engineers, the Sells/Nilsson filter employed in the Naim DAC comprises a brickwall IIR filter running on a SHARC DSP with a far gentler 6th-order analogue filter feeding the output. Distinct from the 8x FIR digital filters used in Naim's CD players, this IIR filter increases all incoming sample rates to one of two elevated base rates – 768kHz (for 48k/96k/192kHz media) and 705.6kHz (for 44.1k/88.2k/176.4kHz media). The Burr-Brown PCM1704 DAC will convert data at 768kHz/24-bit but its response is not as extended as expected. In this case the coefficients employed by Naim's custom IIR filter cut in earlier, delivering a 60th-order roll-off at 30kHz even with 192kHz audio. These final characteristics were arrived at after a full year of intensive listening tests. But then what would you expect of Naim, convention? PM



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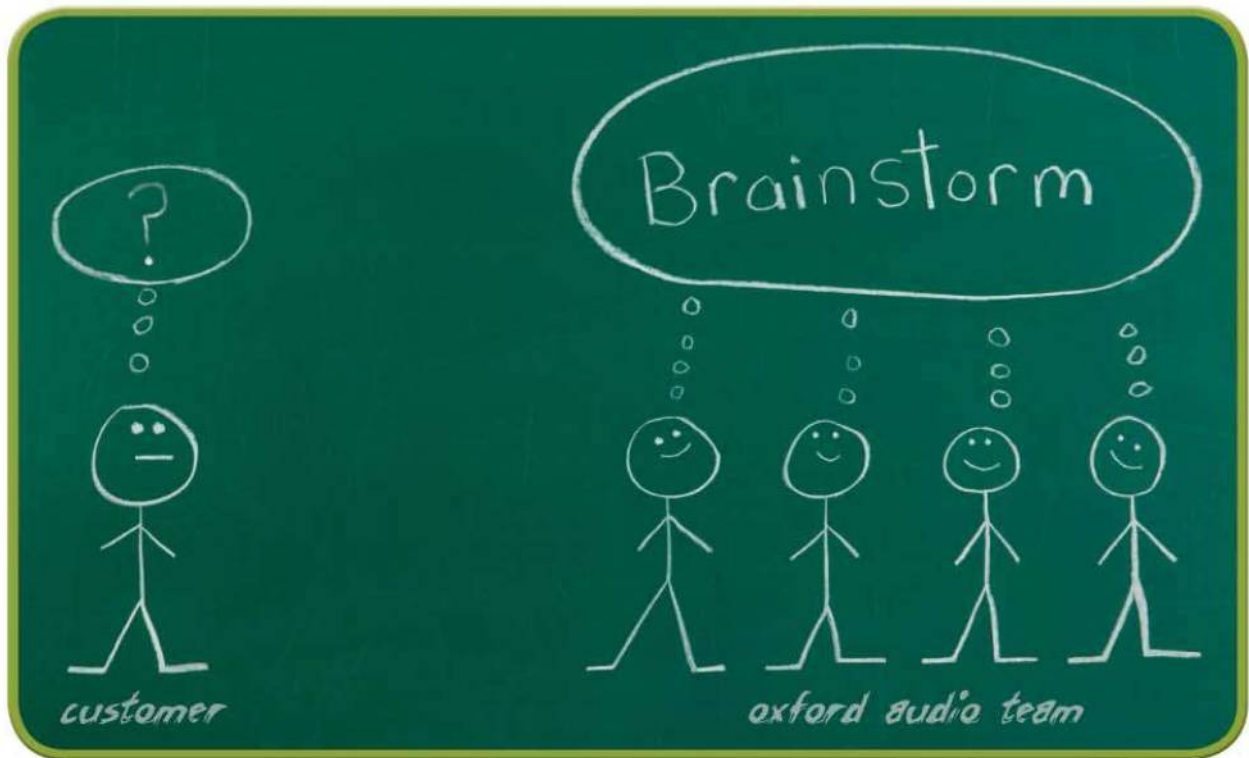
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## CD PLAYER & DAC



**ABOVE:** It's a long time since Naim insisted on DIN connectors but they are still offered, alongside phonos. Selecting between them is via switch on the DAC, via a software control on the CDX2

reproduced like this while Paul Kossoff was still alive. I might have bought a long wig and bunked off to a gig.

Of course, I tried other comparisons of the CDX2 with and without the DAC, always with much the same outcome. No question, the DAC lifts the CDX2 on to a new plane. So what happens when the DAC is powered by an XPS? More of the same? Not quite.

The XPS's most profound effect is on dynamics. Returning to the Volodos, the piano sound was more sharply etched, even more solid, and louder. Now there was a time when audio pundits would insist that anything that sounded louder must be worse because it was generating more distortion. Well, they obviously never heard this kind of louder which has everything to do with dynamic alacrity and weight, and nothing whatever to do with THD.

It may seem crazy that the XPS should cost half as much again as the DAC itself, but as an upgrade it is unquestionably effective. Once you've heard the DAC with XPS connected, you wouldn't want to be without it. Simple as that.

### MORE VITAL

The combination delivers on hi-res programme too. With the DAC/XPS hooked up to the Prism Sound Orpheus I was able to compare it directly with the Orpheus's own converters, initially on the 24/96 version of Diana Krall's 'Narrow Daylight', ripped from the DVD-A side of *The Girl In The Other Room* DualDisc [Verve B0003758-82].

Without doubt the Naim combination was better, removing a slight veiling apparent via the Orpheus's analogue outputs

to reveal a more vital, vivid performance in which all the elements were better resolved and more tightly controlled. Bearing in mind that the Orpheus offers eight channels of D-to-A conversion, and much else besides, for only a little more than the cost of the XPS alone, this is as it should be, of course – but the Orpheus is no pushover.

It was the same with the Blue Man Group's 'Sing Along' from 'The Complex' DVD-A [DTS Entertainment 69286-01120-9-4], also a 24/96 recording. The Naim combination was tighter, and delivered the punchy synthesised bass line with great power and precision.

My experience of the Naim Audio product range – while much greater than it was a few months ago – is not wide enough to be dogmatic about this but I suspect the DAC is one of the best value products Naim now makes. It is certainly a very fine outboard DAC, and with the optional XPS becomes more exceptional still. It was a long time coming – but well worth the wait. ☺

### HI-FI NEWS VERDICT

Naim Audio held out against the outboard D-to-A converter longer than most but there's no evidence of the new Naim DAC being in any way behind the game as a result. It may have arrived late – but what an entrance. Constructed with Naim's traditional no-nonsense, robust simplicity, it delivers spacious, dynamic yet insightful sound on its own, and really blossoms when used with the XPS external supply.

Sound Quality: 83%

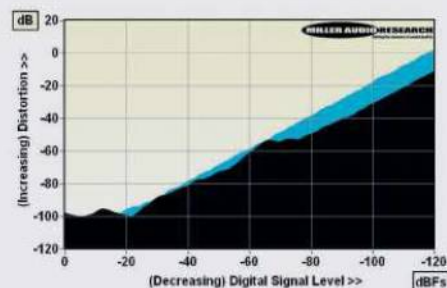


## NAIM DAC (£1995)

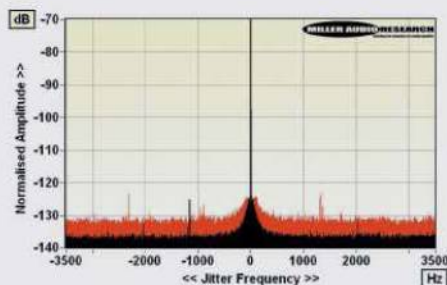
Naim's first outboard DAC combines areas of performance that are truly state-of-the-art and others that are purely artistic. Its claim of exceedingly low jitter is clearly borne out [see Graph 2, below] with figures below 15psec being recorded at all sample rates between 44.1kHz through to 192kHz. The 2.3V output will benefit in practice from its low 17ohm source impedance while the wide 109dB A-wtd S/N ratio and excellent low-level resolution are further points in its favour. Distortion falls to as low as 0.0005% through the midrange at 0dBfs but the harmonic complement is very extended, albeit largely even-order, up to and beyond the 10th.

At very high frequencies, distortion remains less than 0.001% at all sample rates due, in part, to the action of Naim's filter suppressing the harmonics of, say, 20kHz signals at 40kHz and 60kHz. Conventional DAC designs will necessarily place the filter pole(s) at higher frequency to maintain the wide bandwidth possible with 96kHz and 192kHz digital audio. In this case Naim's custom digital filter acts earlier than is typical, providing reduced attenuation of stopband artefacts immediately adjacent to the top-end of 48kHz recordings (just -44dB at 26kHz re. 22kHz) and restricting the response of both 96kHz and 192kHz digital audio to a -3dB point of 27kHz. Lower 44.1kHz and 48kHz sample rates feature a -0.75dB roll-off at 20kHz. The decision to employ such a filter is a subjective judgement on the part of Naim's engineers [see boxout p55].

Readers are invited to view a comprehensive QC Suite test report for the Naim DAC by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Distortion versus digital signal level over a 120dB dynamic range using 24-bit data at 1kHz (black) and 20kHz (blue)



**ABOVE:** High resolution jitter plot, 48kHz/24-bit data (black) versus 96kHz/24-bit data (red spectrum)

### HI-FI NEWS SPECIFICATIONS

Maximum Output Level	2.28Vrms @ 17ohm
A-wtd S/N Ratio	108.6dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.00055% / 0.0040%
Distortion & Noise (20kHz, 0dBfs)	0.001%
Frequency response (20Hz-20kHz)	+0.0dB to -0.74dB
Digital jitter (48kHz/96kHz; 24-bit)	13psec / ~2psec
Resolution @ -100dB	±0.1dB
Power consumption	9W
Dimensions (WHD)	432x70x301mm

# Electrocompaniet AW400 (£3590 ea)

Reborn Electrocompaniet of Norway has been gaining plaudits worldwide for its audio designs. This powerhouse monoblock conceals an iron fist in a velvet glove

Review: **John Bamford** Lab: **Paul Miller**

As with cars, clothing, confectionary, you name it, brands come and go, in and out of fashion. If you're old enough to have once worn flared jeans and tie dyed tee shirts then you'll remember the 'buzz' among hi-fi hobbyists when Norway's Electrocompaniet first came on the audio scene. You'll also be aware that until recently this famous brand name had all but disappeared off the radar.

Per Abrahamsen's Electrocompaniet company created an audiophile storm on both sides of the Atlantic in the mid 1970s with its first 25W Class A amplifier, based on circuit ideas proposed by Finnish professor of electronics Dr Matti Ojala. But after exporting a range of products across the globe for some three decades, Electrocompaniet eventually ran into difficulties as its brand name had lost its cachet outside its home market, over the years. Only recently has it re-established itself since coming under new ownership [see boxout]. With a fresh portfolio of audiophile components designed and manufactured entirely in-house, Electrocompaniet is firmly back on the hi-fi high street once again, winning admirers among today's audio cognoscenti with the likes of its solidly-engineered 'Classic Line' series – including the ECC 1 CD player and ECI 5 integrated amplifier that we tested back last autumn [HFN Oct '09].

Further up the Classic Line of components are several two-channel and multichannel preamps and power amps, this hefty AW400 monoblock being topped only by the gargantuan AW600 'Nemo' model in the range. Rated at 400W into 8ohm, the AW400 is a two-man lift in its substantial packing carton and no less imposing once unboxed. Folks, you're going to need a mighty big rack – unless you do as I did and place each monoblock on the floor adjacent to its loudspeaker.

**RIGHT:** Under the bonnet of the AW400 lurks a beast of an amplifier, yet in operation it runs silently and produces surprisingly little heat. But don't leave it powered unnecessarily

The AW400 weighs 25kg. To say that a pair of these beasts sitting at the end of your listening room makes something of statement is, er, an understatement.

## UP TO SCRATCH

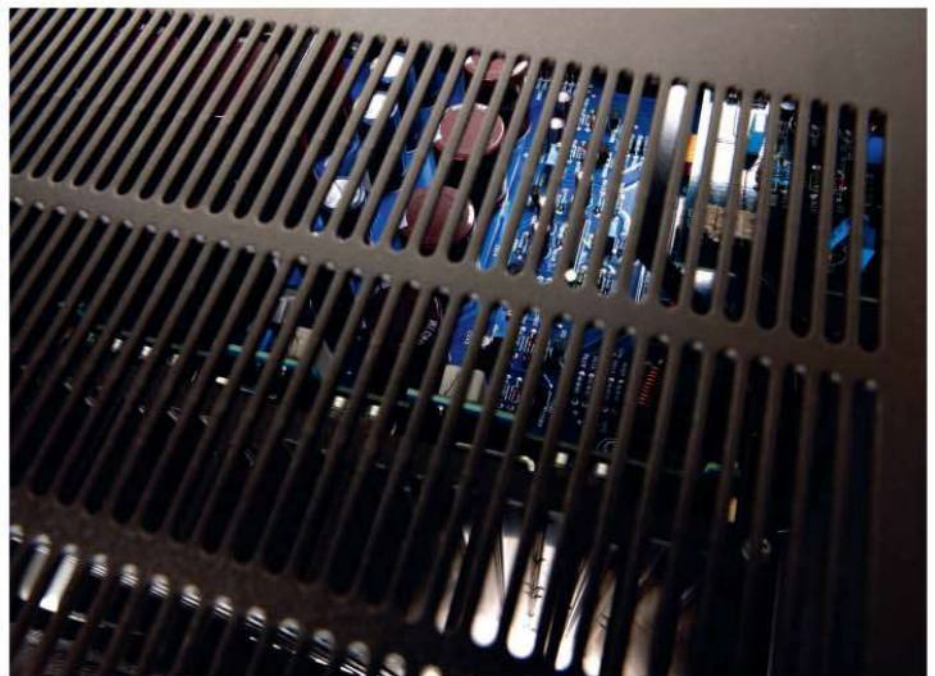
Build quality of the external casework isn't in the luxurious class of the likes of Esoteric, Krell or Chord Electronics, but then neither are the prices. The folded metal casework is finished in black textured paint and rings with a resounding 'boing' when tapped. Nevertheless there are no rough edges, the wrap-over bonnet fully enclosing the massive heatsinks, while the substantial acrylic fascias – 20mm thick, no less – look mighty handsome, especially once each amp is powered up and Electrocompaniet's logo lights up in blue from behind the acrylic panel.

A nice touch is the set of Soundcare SuperSpike feet attached to the bottom of the amplifier. These might look like traditional 'isolators' but in fact they comprise spiked points sitting inside internal cups with felt bases, so you get the

benefit of spikes without scratching any furniture or polished wooden floors (see [www.soundcare.no](http://www.soundcare.no)).

What looks like a gold-coloured volume control on the front is nothing more than a chunky push button to power-on, its satisfying 'clunk' followed immediately by the click of relays as each monster awakens with a soft start. The AW400s proved to be impeccably behaved throughout the three weeks or so of auditioning, not once putting a foot wrong with unwanted clicks or thumps and proving to be commendably silent despite each amplifier's massive toroidal transformer. They ran surprisingly cool, too, but then they don't appear to consume the 220W when idling suggested by Electrocompaniet's brochure [see Lab Report]. In any event, I did my bit to save the planet and manage my electricity bills by turning each AW400 off when not enjoying the music.

A benefit of having two monoblocks rather than a stereo power amp is that each amp can be sited near the loudspeaker, using very short lengths of





**LEFT:** What looks like a volume control knob is simply the power-on button. Just push it to start... and listen for the relays

Trouble's classic *Couldn't Stand The Weather* [Epic EK 39304] it was apparent they could comfortably manage mighty peaks with no apparent effort, and had superb bass control. The guttural attack of Stevie Ray's electric guitar and powerful resonance of the drums' toms and snare rang true-to-life, as the sound was uncommonly direct and hard-hitting.

Naturally enough, having such enormous power on tap meant I was soon rifling through my music collection for examples of sonic fireworks, in order to see

speaker cable. In a sense Electrocompaniet positively encourages such a set-up, as the AW400 has only a balanced input on an XLR socket, so presumes that you will use a preamplifier with balanced outputs; so consequently, running long interconnects is not an issue.

XLR-to-phono socket adaptors are thoughtfully provided, just in case your chosen preamp only has single-ended outputs. There are two sets of binding posts for bi-wiring should your speakers have split crossovers, while what might appear to be a second XLR input at the rear is in fact a 'link' output for daisy-chaining additional power amps. Ah yes, a six-pack of these behemoths in a tri-amped system might be fun for one's neighbours... several streets away.

### A COMFORTABLE RIDE

In its brochure Electrocompaniet describes the AW400s as being 'powerful mono amplifiers, with a characteristic fast and clean sound... built for dynamic

reproduction for low level as well as high level playback'. And sure enough, right from the start they exhibited a sound that was totally relaxed, smooth and delicate, yet controlled with a vice-like grip.

When trying to explain to non-audiophiles the benefit of having enormous power reserves on tap, one usually resorts to the oft-used car analogy. You know: there's a difference

between cruising at 70mph in a Renault Clio and cruising at 70mph in a Bentley. But these AW400s aren't like the Bentleys of yore, all smooth, genteel and refined. They're more like modern, muscular Bentleys that, whilst still comfortable and cosseting, are nevertheless capable of triggering brutal excitement on demand.

When I was revelling in 'Tin Pan Alley' from Stevie Ray Vaughan and Double

precisely how effectively my Townshend Sir Galahad speakers could rattle the light fittings – along with anything else in the listening room that wasn't strapped down.


And I wasn't disappointed as Frankie's 12in singles of 'Relax' and 'Two Tribes' nearly brought the ceiling down while the amplifiers appeared not even to be trying. The only compression was at my

'12in singles of "Relax" and "Two Tribes" nearly brought the ceiling down'

ears. Meanwhile classic 'reference' showcases such as David Sylvian's *Rain Tree Crow* [Virgin CDV 2659] and Grace Jones' vinyl cut of *Slave To The Rhythm* [ZTT/Island

Grace 1] highlighted the awe-inspiring bass power and depth of the AW400s as the lowest registers of synthesized bass crawled across the carpet and out through the French windows to entertain the neighbours at the bottom of my garden.

### FINNISH CHARMS

You'll have got the picture by now that the AW400s provide bags of fun. But they're not simply about going loud and deep. Seemingly possessing an iron fist in a velvet glove, they sounded delicately sweet and refined when the music demanded that too. There's a charming recording entitled *The Zappa Album* by Ensemble Ambrosius [BIS/Northern Lights CD-5013], a group of musicians from Helsinki who play a selection of Zappa's rock, jazz and 'difficult' Synclavier compositions on baroque instruments (yes, really...). This showed the AW400s to have a lightness of touch 

### TAKING CONTROL

Electrocompaniet was acquired in 2004 by Norwegian firm Westcontrol, whose CEO is company founder Mikal Dreggevik. He created Westcontrol in 1994 to supply electronic control systems for agricultural and industrial machinery. Since its creation, the business has expanded to become a major systems house for development and manufacturing of all manner of analogue and digital electronics, and employs around 100 people with an annual turnover approaching £10m (see [www.westcontrol.com](http://www.westcontrol.com)). High-end Norwegian manufacturer Dynamic Precision was also acquired in 2007 and now comes under the Electrocompaniet umbrella as the marque's flagship 'DP' line of components, used by the likes of Oslo's pioneering Lyndberg Lyd studio which records in high resolution for its 2L music label (see <http://www.lindberg.no/>).

# AMPLIFIER

# LAB REPORT

## ELECTROCOMPANIET AW400 (£3590)

Electro calls this a 'Class A' Reference Amplifier and it probably is up to a few tens of Watts but certainly not the 400W of its rated specification. At idle, its power consumption is 95W (not the 220W quoted on its website) increasing to 720W at 400W/8ohm. Of course the AW400 is not short on grunt, delivering 430W into 8ohm and just shy of 700W into 4ohm with a whopping 1.4kW available under dynamic conditions into 2ohm [see Graph 1, below]. The amplifier's response has its -1dB points at 60kHz and well below 5Hz but the output impedance is rather higher than specified (<0.009ohm) at 0.07ohm through bass and midrange to a moderate 0.11ohm at 20kHz. Expect some slight modification of the amp/speaker system response at HF as a result.

Distortion is low through bass and midrange frequencies, decreasing from 0.004% to 0.0025% at 10W over a 30 minute warm-up period and gently increasing with frequency, reaching 0.011% at 10kHz, 0.02% at 20kHz and 0.044% at 40kHz [see Graph 2, below]. Distortion also increases in line with power output, from a low of 0.001% at 1kHz/1W to 0.003% at 10W and 0.0045% at 100W – once again the trends are gentle, rather than tax the listener with abrupt changes in 'character'. Noise is usefully low, the AW400 offering a 90dB A-wtd S/N ratio (re. 0dBW), widening to 116dB at its rated output while the overall gain is a perfectly useable +34.2dB via its balanced inputs. Readers are invited to view a comprehensive QC Suite test report for Electrocompaniet's AW400 monoblock power amp by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** A balanced (XLR) input sits alongside a link output for daisy-chaining amplifiers. Input level adjustment provides for level matching in bi-amped systems

together with a pristine clarity. As oboe, glockenspiel, harpsichord, violin and mandolin clattered their way through 'Inca Roads' (from Zappa's album *One Size Fits All*), with baroque bassoon vigorously 'parping' the bass lines with gusto, the vibrant tonal colours of the ensemble's period instruments were vividly portrayed within the hollow acoustic of the recording space.

### VIBRANT AND FRESH

Combined with the taut, powerful bass that affords clarity and texture when describing the precise character of bass sounds, the AW400s also sounded vivid and 'pristine' throughout the audible range. And unlike many macho solid-state amps that regularly fail to 'let go', the Electrocompaniet allowed the music to breathe.

Yes, bass transients appeared fast and precise, but where many muscle amps can sound too tight, strangling the life out of music, the AW400s rarely sounded anything other than vibrant and 'fresh'. This was highlighted by Keith Johnson's Reference recordings of Copland's *Fanfare For The Common Man* and *Appalachian Spring* [RR-93CD], which captured in magical fashion the scale and shape of Orchestra Hall, Minneapolis. The Electro's low-level resolution fleshed out the pianissimos of *Appalachian Spring* with a startlingly lifelike character

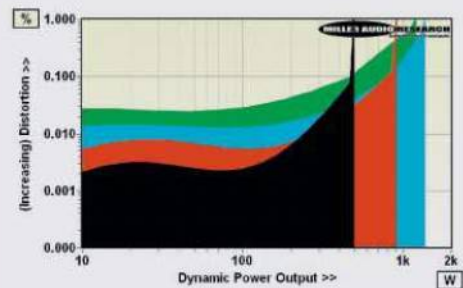
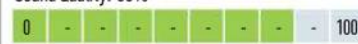
usually only experienced 'live', when seated in such a concert hall. Clearly, having a pair of 6ft tall speakers, each approaching the weight of small piano, 20ft in front of your sofa and driven by a pair of substantially powerful monoblocks that are never pushed beyond merely cruising, is the next best thing.

Electrocompaniet claims to have two house 'sound signatures', its powerful monoblocks being designed for accurate analysis of recordings with a fast and clean character. I concur: these AW400s possess tremendous speed and definition, yet in my reference system their insightfulness was coupled with a luxurious sense of relaxed effortlessness. ⚡

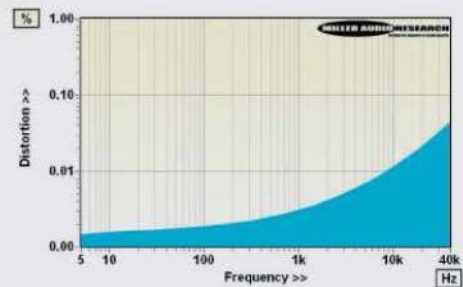
### HI-FI NEWS VERDICT

With gold on black lettering, acrylic faceplates and blue illumination, today's Electrocompaniet components look a little like classic McIntosh gear to me. Either you'll like the styling, or you won't. Still, these AW400s pack a heck of a punch while also sounding delicate and nimble. If you're after building a big, powerful system, you really should ask your dealer for a listen. For they're simply thrilling.

Sound Quality: 80%



**ABOVE:** Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads.



**ABOVE:** Distortion vs. frequency from 5Hz to 40kHz (10W/8ohm). Gradual increase in distortion at HF from gradual reduction in compensation (feedback)

### HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	428W / 694W
Dynamic power (<1% THD, 8/4/2/1ohm)	495W / 910W / 1.38kW / 1.2kW
Output impedance (20Hz–20kHz)	0.072–0.115ohm
Frequency response (20Hz–100kHz)	+0.0dB to –2.7dB
Input sensitivity (for 0dBW/400W)	56mV / 1130mV
A-wtd S/N ratio (re. 0dBW/400W)	89.5dB / 115.5dB
Distortion (20Hz–20kHz)	0.0014–0.025%
Power consumption (Idle/Rated o/p)	95W/720W (each)
Dimensions (WHD)	514x288x470mm (pair)

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# Vinyl Frontier

BEHIND THE MUSIC WITH HI-FI NEWS & RECORD REVIEW

This month it's the pick of more recent gems as **Paul Hawkins** brings you his round-up of what's new in the world of brand new vinyl re-issues and releases

**D**omino Records takes full advantage of the fuss surrounding the reformation of one of the most important bands in US alternative rock... and why not! It's hard to believe that a retrospective of Pavement's career has taken this long to appear, but at last a superb double LP – *Quarantine The Past: The Best of Pavement* [WIG250] – brings together all the highlights from the band's seven-year, five-studio-album career

From the band's first release in 1989, their importance as part of the (then) brand new alternative US indie lo-fi scene could never be overestimated, although they never gained the notoriety of their peers The Pixies, Sonic Youth and REM. Taking the 'quiet/loud' ethic of The Pixies, Pavement's cryptic lyrics were intriguingly bellowed by the fragile voice of Stephen Malkmus, offset against trademark 'just in tune' off-kilter guitar riffs and big choruses.

On paper it all sounds like a challenge, but the band's perfect ear for a melody made them as listenable and singalong as any big guitar band of the era. They were America's best kept secret, and in 1990 they were hotly tipped as the 'next big thing'. Had they known the effect Nirvana's *Nevermind* was to have on the international music scene in 1992, perhaps the band might have rush released their debut LP *Slanted And Enchanted* slightly earlier, and it would have received the attention it deserved. Regardless, Pavement went on to gain a dedicated following across the globe, which continued after the band broke up in 1999 and fragmented into Preston School Of Industry, Steve Malkmus & The Jicks, and Marble Valley. If you've not got a Pavement LP in your collection, then this new release is a compulsory purchase!

## MUSIC ON THE MOV

The releases from Music On Vinyl ([www.musiconvinyl.com](http://www.musiconvinyl.com)) are coming at an incredible pace. Now fully established as Sony Europe's vinyl re-issue arm, its tally of new releases has now topped 50, and all in the space of just a few months.

The company is also handling the European Jimi Hendrix releases and

re-issues, which are due shortly. Many of the titles have counterpart pressings on Sony Legacy in the US, and some go over familiar Simply Vinyl ground. However, we're delighted to see a few, fairly recent forgotten gems from the Sony catalogue.

## SLAVE TO THE RHYTHM

The first of these is from Audioslave – one of the rare cases where the remnants of two great bands came together and created an even greater band. Consisting of three quarters of Rage Against The Machine plus former Soundgarden singer Chris Cornell, Audioslave came onto the music scene with a mix of '70s Zeppelin and Sabbath, warped into the year 2000 and beyond. The band's debut single 'Cochise' was a worldwide smash and the second single, 'Like a Stone', even topped

that, being certified Gold by the RIAA. The band's eponymous debut studio album was also certified Gold (within a month of its release) and this new version is a double 180g LP in a gatefold sleeve

[MOVLP081]. Soundgarden fans might also be excited to hear that the band have recently reformed, although they're yet to release new material. Watch this space!

## AN EDUCATION...

Next up is a modern soul classic. Lauryn Hill's debut solo LP, *The Miseducation Of...*, built on the enormous success the singer enjoyed with '90s hip-hop collective The Fugees. The material on the album came as something of a surprise to an industry expecting nothing more than a 'cashing-in' album, despite it being obvious that Hill's amazing vocal was the magic that made The Fugees so accessible internationally. Rather, here was a solid, self-penned and self-produced set, offering a fully focused fusion of Motown, Gospel, Funk, Soul, Hip Hop and Reggae.

It's a sophisticated piece of work, almost a *What's Going On* for the '90s. There's political comment and satire mixed with thought-provoking lyrics drawn from deeply personal experience. It's upbeat, downbeat, charismatic and reflective, and it rightly made Hill a spokeswoman for her generation. A thoroughly modern LP at the

'It seems like five minutes ago that this LP was on the shelves'

## PAUL HAWKINS

Paul Hawkins is co-owner of independent record store Diverse Music and the company's mail-order arm, Diverse Vinyl – now the UK's largest independent retailer of brand new LP titles. Paul also manages Diverse Records, overseeing the production of many audiophile vinyl LPs by an eclectic range of artists. See [www.diverserecords.com](http://www.diverserecords.com) for more.



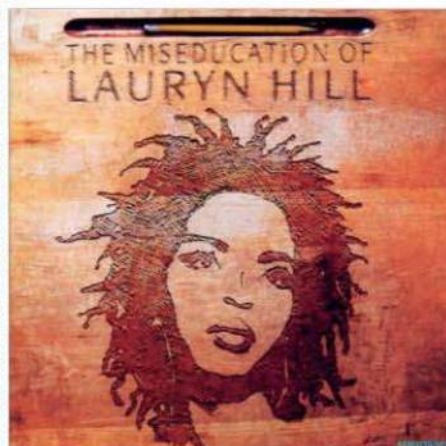
time of release, it shows no sign of dating 12 years on – a sure sign of a true classic! If you missed the original LP when released – and the Simply Vinyl re-issue – then it's third time lucky for you with this 180g vinyl offering [MOVLP060].

## KINGS OF LEON

It seems like only five minutes ago that this album was sitting on the shelves, but the recent explosion of popularity for the band has seen all remaining 10in vinyl copies of their 2005 sophomore LP snapped up.

Far from the strains of 'Sex On Fire', which appears almost daily on one advert or another, *Aha Shake Heartbreak* was an understated LP, showcasing a talented bunch of young musicians from the Deep South still finding their feet. Comparisons with Creedence and Skynyrd are inevitable, but there's a raw, exciting element to tracks like the ramble of 'The Bucket' and the contemplative 'Milk' suggesting there's more to this band than meets the ear!

There's a new confidence on this recording that's missing from their debut, but not the overconfidence that sometimes characterises a band recording a second album with a comfortable support network behind them (why am I thinking of The Strokes, all of a sudden?).



➔ 'A modern soul classic' – don't miss the latest re-release of Hill's finest





➔ Originally a 2x10in LP, Kings of Leon now enjoy a premium vinyl release

Consequently, while the first album has more of that raw appeal, and the third is a more all round polished affair, for me *Aha Shake Heartbreak* gets the balance absolutely right. Another 180g release, the catalogue number is MOVLP055.

### SADE SINGS AGAIN...

A well timed and welcome return for Sade's fifth LP from 2000. *Lovers Rock* ended an eight year period of inactivity for the soul singer, its modern, almost rock-like production feel bringing her sound bang up to date. It's very much business as usual for the band, who gel tightly as a songwriting unit to produce a string of sultry, smoky, late night soul ballads.

The album originally reached No 18 in the UK Albums Chart and No 3 in the US Billboard 200 and has since been certified triple platinum by the RIAA, earning Sade a Grammy Award for Best Pop Vocal Album along the way. She is the most successful solo female artist in the UK, having sold over 50 million albums. Pioneering the Nu Soul genre roughly 10 years before her US colleagues, Sade is one of a kind. The 180g re-release is available now [MOVLP067].

### A MAJOR ADVANCE

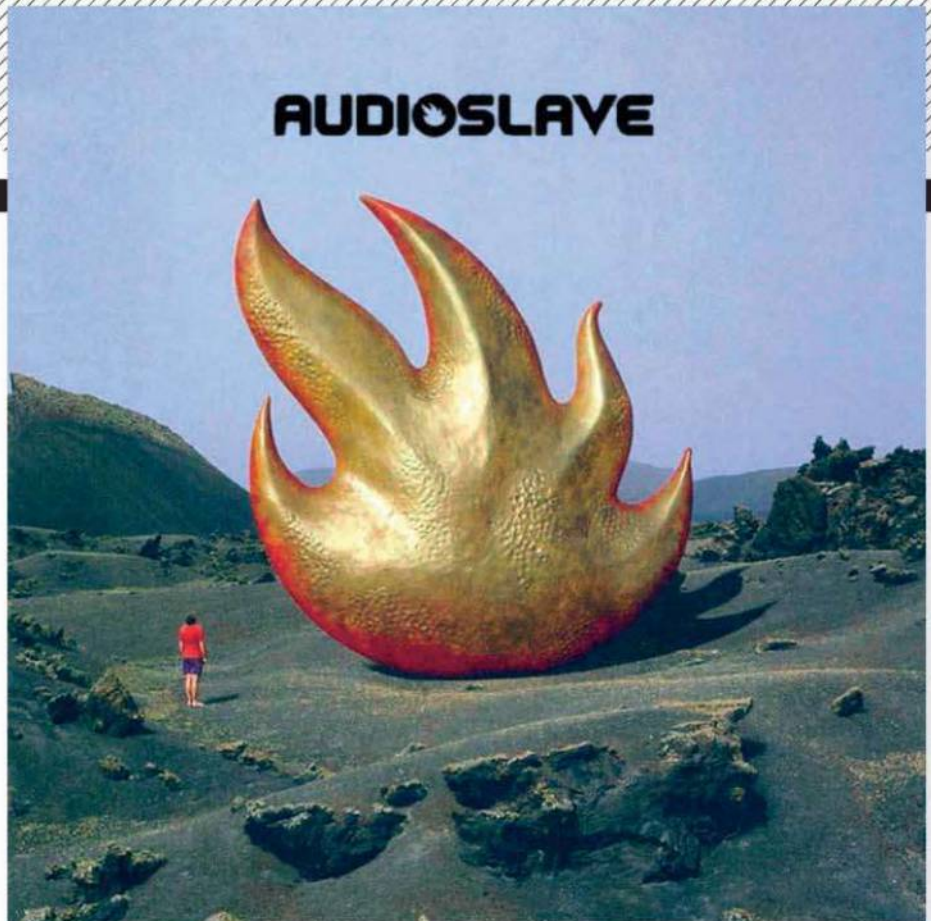
Danish duo The Raveonettes launched their superb debut mini LP *Whip It On* back in 2002. Deconstructing rock 'n' roll in their own unique style, the band quote among their influences Suicide, Buddy Holly, The



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**THE RAVEONETTES**

photo credit:  
 Søren Solkær Starbird



Clash, The Everly Brothers, The Cramps, My Bloody Valentine, Kraftwerk, The Pogues, Sonic Youth, The Velvet Underground, Eddie Cochran, The Ramones, Elvis Presley and The Ronettes. And believe me, you can hear them all here.

*Chain Gang Of Love*, originally released in August 2003, is the duo's first full length album. The most noticeable difference in sound between the debut EP, which had all songs in B-flat minor, is that this album has all the songs in B-flat major. The result is a set drenched in uplifting '50s and '60s sounds, complete with retro/Tarantino film poster-style artwork.

### BROTHERS' BEST

The importance of The Everly Brothers in the history of rock music can never be overstated, yet strangely they're not always the first names thought of as pioneers. Don

and Phil Everly grew up in a post-depression USA, in a musical family, and often appeared on local radio accompanying their guitarist father with their trademark vocal harmonies.

The duo soon caught the attention of Columbia Records,

➔ Uplifting '50s and '60s sounds – The Raveonettes' debut LP is out again on MOV

➔ Audioslave receive the double-LP treatment with this 180g re-issue

which was beginning to realise there might be some mileage in the 'teenage' market. However, a choice of a traditional country song proved unsuccessful with radio stations and the public at large – especially when pitched against the new rising stars on the Sun label, such as Johnny Cash, with his groundbreaking rough 'n' ready sound.

Taking influence from the popular doo-wop sound of the Midwest, and mixing it up with Appalachian roots, traditional country music, and a little of the rock 'n' roll of their peers, the brothers eventually developed a sound that was entirely their own. By 1957 they'd hit No 2 in the US Billboard charts with 'Bye Bye Love' – their first release for Cadence Records.

As a clean-cut alternative to Elvis Presley and Gerry Lee Lewis, the Everlys might have lost out in the heart-throb stakes, but their 'parent appeal' ensured mainstream success. By the turn of the next decade they were among the highest earners in the world of rock 'n' roll. Before long the duo left Cadence for Warner Music, where they helped further the development of the country rock movement.

Late March sees the release of *For Always* [43270 LP] on the Vinyl Passion label – a compilation of the brothers' early hits that stands as a reminder of just how prolific they were in those early years. Tracks like 'Wake Up Little Susie', 'All I Have To Do Is Dream' and 'Maybe Tomorrow' are all included on this 23-track LP. ☺

# Vinyl Release

BEHIND THE MUSIC WITH HI-FI NEWS & RECORD REVIEW

## Guns N' Roses: *Appetite For Destruction*

It remains the fastest-selling debut album in history. Steve Sutherland takes you backstage with G N' R, as the band's 1987 release is re-issued on 180g vinyl

The voice on the phone is American, vaguely familiar and, more to the point, somewhat pissed off.

'Is Steve Sutherland there?'

I immediately do what all music journalists do under such circumstances – put on a fake voice and lie:

'Er... I'm not sure,' I say, a dodgy mockney twang usurping my native Wiltshire burr. 'Who's calling? I'll try and find him for you.'

'Axl Rose,' comes the reply. 'From Guns N' Roses. We're on our way to the airport and thought we'd swing by and have a word with the mutha about his review.'

The review on dear old Axl's mind is my critique in *Melody Maker* of the Gunners' UK debut at the legendary Marquee Club where I'd more or less called them heavy metal morons, outmoded Led Zeppelin throwbacks and sexist Neanderthals to boot. And now, not to put too fine a point on it, the way Axl is pronouncing the phrase 'have a word' leaves me under no illusion that what he actually means is 'give him a proper good kicking.'

So what the heck? I lie again: 'I'm terribly sorry,' I say, 'he's not here right now.' Axl had already hung up. He knew. This was back in '87 and if I'd known then that the Gunners would swiftly turn out to

be the biggest, most notorious, and – yes, I admit it – best band in the world, I'd probably have invited them on over, taken the beating coming my way, got my teeth fixed up again and dined out on the anecdote until the inevitable Alzheimers set in. But that's hindsight for you, eh?

As it happens, though, I did get to meet Axl, mano-a-mano as it were, four years later. I was sent to Seattle, to the massive Tacoma Dome indoor sports arena to be precise, because the album we're here to talk about, the band's debut, the perfectly titled 'Appetite For Destruction', had sold upwards of 16 million copies and, for some characteristically mad reason, the band were about to release two new albums simultaneously – the equally smartly named *Use Your Illusion Volumes I & II*.

### THE REAL THING

The Gunners, you see, were a bona fide phenomenon. We journos would habitually bang on about punk rock but really, before the Gunners, there was just punk – which was an angry minority interest – and rock, which was massively popular, clichéd and largely brainless. But Guns N' Roses were the real thing – anarchy on a unit-shifting, generation-defining, monstrous worldwide scale. In other words, literally punk rock. Like Led Zep, they were towering and untouchable. Like the Pistols, they were dangerous, always a disaster waiting to happen. And like The Beatles, each one was such a character that it was entirely possible to get into a drunken fight over who was your favourite Gunner.

Singer W Axl Rose was a troubled genius from Indiana with an excessive police record. Most rock singers sang from the throat when they should sing from the gut. Axl sang from his balls. He also danced

### STEVE SUTHERLAND

Steve edited *NME* from 1992-2000, the Britpop years, launching *NME.com* and reviving the NME Awards. Previously he was Assistant Editor on *Melody Maker*. Among his many adventures he has been physically threatened by Axl Rose, hung out awhile with Jerry Garcia and had a drink or two with Keith Richards...



from his hips in this sidwinding shuffle that, along with the band's collective sultry good looks, made them the most shaggable band on the planet.

Between the Marquee and Tacoma Dome gigs, Axl had, in rapid succession, been mysteriously hospitalised, fired by the band for going AWOL in Phoenix, reinstated, and arrested in Australia. He had seen two fans die at Donington when the crowd stampeded to get closer to the stage and, when supporting the Stones in LA, had announced, on a whim, that the Gunners were over. He said he was, 'sick and tired of too many people in this organisation dancing with Mr Brownstone'

– a reference to one of the band's most infamous *Appetite* songs about heroin.

The next night, Slash, the tousle-haired, top-hatted ace guitarist, wore a Betty Ford

Clinic T-shirt and admitted his addiction in front of 83,000 people. The band stayed together. Just. Slash (real name Saul Hudson from Stoke; famously fond of snakes) detoxed in Arizona after being found by members of the public on more than one occasion smacked-out and pretty much dead, often in the lift of the Hyatt Hotel on Sunset Boulevard.

The other guitarist, the gypsy-looking Izzy Stradlin, aka Jeff Isabelle, shared Slash's liking for narcotics and got himself arrested for pissing in the kitchen on a plane, while the blonde bassist Duff McKagan was working hard on becoming an alcoholic and busy getting divorced.

Steven Adler, the drummer on *Appetite*, was, amazingly, worse than the rest. He'd actually got himself fired by the Gunners for doing too much smack, and was last seen sitting in the gutter on Melrose, wearing only one shoe and telling anyone who'd listen that he was gonna sue the Gunners for getting him addicted. The Cult's Matt Sorum, himself a considerable party animal, replaced him behind the kit.

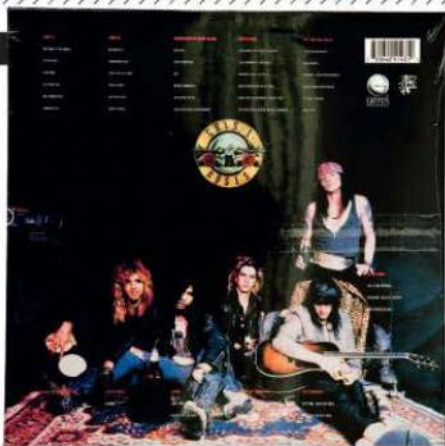
'G N' R were  
always a disaster  
waiting to happen'



GUNS N' ROSES



The band in 1987 – (l-r) Matt Sorum (who replaced Steven Adler), Izzy Stradlin, Duff McKagan, Axl Rose, Slash



➔ Priced £21.99, the 180g release of *Appetite For Destruction* is available at [www.classicips.co.uk](http://www.classicips.co.uk)

The band – who had started out pretty much as an LA street gang, all living together in one room in Gardner Street off Sunset they called the Hellhouse, practising there, partying, selling smack, pimping girlfriends, hustling, drinking, fighting with and for each other – were now travelling separately. Axl had become something of a prima donna, prone to turning up very late to most of the preceding gigs on the tour. When he could, he stayed in separate hotels from the rest of the band (they were banned from so many though, Slash later told me, that this wasn't always possible).

Izzy wouldn't fly – he drove cross country from gig to gig with his woman and his dog in a station wagon. Only Slash, Matt and Duff still partied together old school but the band had a ritual – no matter what their beef with each other, they always convened backstage in preparation for the gig.

#### TO WORK...

And so it was I found myself shoulder to shoulder with Axl, crammed into a small room with his fellow Gunners just prior to the show. Axl didn't mention the Marquee review. In fact, he didn't talk at all. None of them did. They barely looked at each other. They just smoked and listened to AC/DC's *Back In Black* at proper full volume and when that great album ended, wordlessly, they went to work, intent on bettering one of rock's great highs.

'You want the best,' the stage announcer had roared. 'They couldn't make it! Here's Guns N' f\*\*\*\*n' Roses!'

It was the greatest gig I ever saw, no contest. And *Appetite* is the greatest debut album of all time. Produced by Mike Clink, a West Coast hair metal scenester, it boasts six tracks that can, by any measure,

'So it was I found myself shoulder to shoulder with Axl'

Mine' not only boasts the most famous and instantly recognisable guitar coda ever recorded but, in the 'Where do we go?' bit, one of the great vocal improvises as well.

#### LOST IN PARADISE

Ridiculously assured, untameably exciting and just plain brilliant, it also features that acme of good time anthems, 'Paradise City', which I vividly recall as the Tacoma encore. Axl had been poncing about in a white Stetson, a pair of cycling shorts, a stars 'n' stripes shirt and a plastic pig's snout – a present, he claimed, from the Tacoma Police Department. But he was bare-chested now, tearing the bracelets

he hailed as classics. 'Welcome To The Jungle' is an exhilarating tour through a dangerously hedonistic lifestyle most of us can only dream about, 'Night Train' celebrates the noxious high obtained through imbibing a particularly cheap and potent wine, 'My Michelle' never flinches in its honest portrayal of a young girl's lifestyle at the dark end of the street, the aforementioned 'Mr Brownstone' fixes with a firm gaze the real dilemmas facing

those in service to the junkie lifestyle, 'Rocket Queen' sneaks in the taped sounds of Axl having sex with one of the drummer's girlfriends in the studio and 'Sweet Child O'

from his arms and tossing them to the back of the stage before launching himself, spread-eagled, into the crowd. He'd discarded the bangles, Slash told me later, because he'd once stagedived in New York and some psycho had grabbed onto them and wouldn't let go. Axl's arms had been torn up pretty bad, blood everywhere.

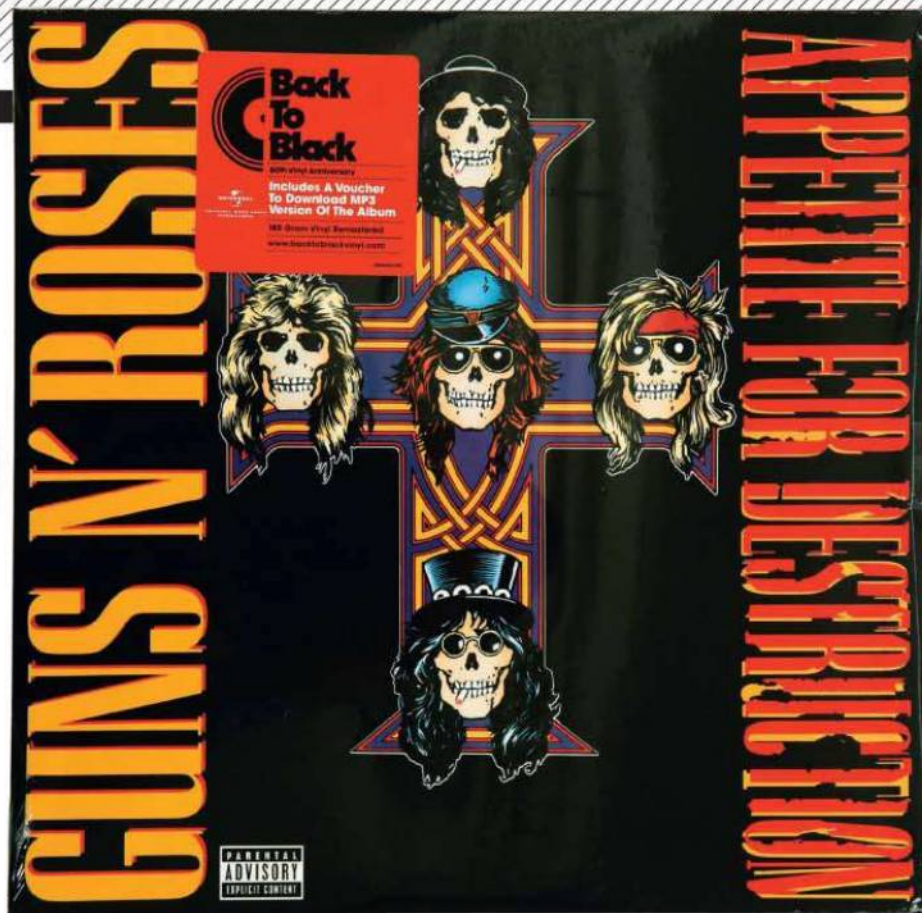
For a moment in Tacoma, Axl was lost, swallowed up in the seething mass. And then he re-emerged, punching at the clinging hands, lashing out, fighting his way back onstage. He turned to face the crowd and grinned: 'Some f\*\*\*\*n' faggot tried to take my pants off!' And then he was gone. ☺

With most of this set written while the band were still doing the rounds of the mid-'80s Los Angeles club circuit, it's to their credit that the grit and purity of their sound was not lost when they were let loose amid thousands of dollars' worth of studio gear. From the sleaze-rock of 'Welcome To The Jungle' to the trashy swagger of 'Rocket Queen', this 180g re-issue repays its premium price with a cavernous soundstage in which drums slam, the bass motors and the intricacies of the guitars are fully revealed. Epic! HFN

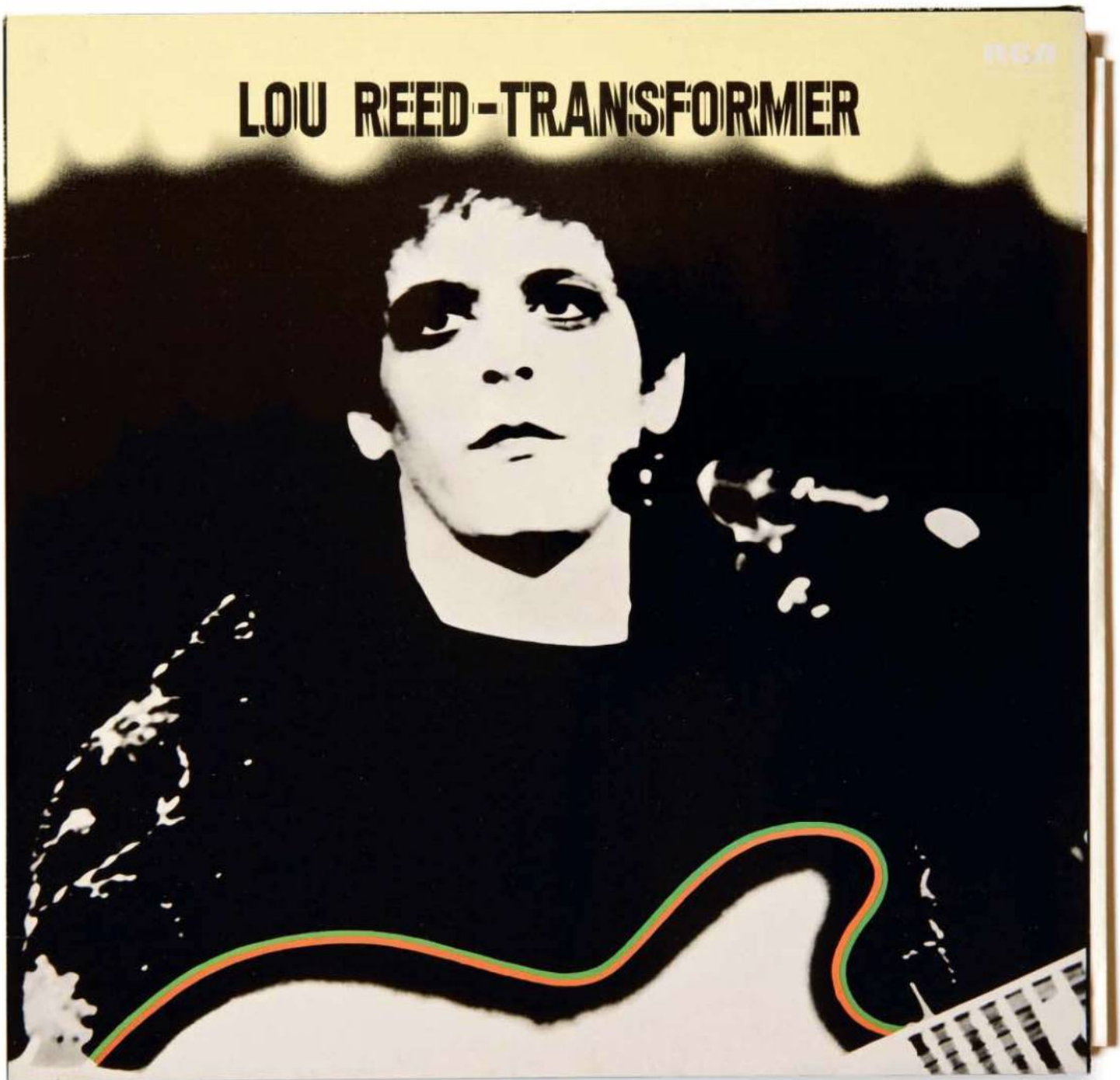
#### RE-RELEASE VERDICT

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Sound Quality: 85%



LOU REED-TRANSFORMER



# Lou Reed *Transformer*

With almost 30 different issues since its release 38 years ago, the iconic status of *Transformer* is beyond doubt. Would this have been the case if the original sleeve image had been used and 'Walk On The Wildside' had sounded like a military march?

Words: **Chris Heard**

**V**icious. You hit me with a flower. You do it every hour. Ooh baby you're so vicious.'

With this campfest of opening couplets the world was introduced to *Transformer*, Lou Reed's dark love letter to Andy Warhol and his supporting cast of misfits, wannabes and circus freaks whom Reed had encountered as singer with the Velvet Underground, kings of New York's late '60s avant-garde music and art scene.

The album, recorded in London with David Bowie and Mick Ronson, was unleashed to critical acclaim and surprising commercial success in November 1972, reaching No 13 in the UK and spawning a Top 10 hit in 'Walk On The Wild Side', a deceptively sleazy tale of Warhol's Factory art-project acolytes.

### ERA DEFINING

Alongside his new pal Bowie's *Ziggy Stardust* album, released five months earlier, *Transformer* earned its stripes as arguably the defining rock record of the era. Its combination of stripped-down, glammed-up rock 'n' roll, delicate melodies and Reed's deadpan street poetry delivered in his trademark New York drawl offered a sometimes menacing alternative to the early '70s-hangover staple of twee singer-songwriters, bumptious progressive rock and cheesy pop. Almost 40 years on, it is still stunningly fresh. As David Fricke, senior editor of *Rolling Stone* magazine, said: 'It sounds great now because it wasn't made to sound like 1972.'

Reed had left the Velvets quite suddenly two years earlier, walking



➔ The rear of the album sleeve which, with its risqué imagery, soon became as famous as the main cover shot

➔ Reed performs on stage in the mid-1970s

➔ Reed pictured with The Velvet Underground; he left in to go solo in 1970

off stage at Max's Kansas City in Manhattan in August 1970 and heading to his parents' home in the suburbs to lick his wounds in the wake of a management fall-out. Before long he had turned up in London to make his debut solo album, working with session men including a relatively unknown Rick Wakeman. Yet the result was an unfocused mish-mash of tunes including partly-finished Velvets pieces, and it flopped.

### ENTER BOWIE...

It was his fateful introduction to Bowie that changed everything. Reed was seeking a pop audience, while Bowie had placed himself firmly in the artistic tradition of the Velvets. Bowie had hero-worshipped Reed from a distance, and in turn Reed obtained the services of a marquee name producer. Bowie said: 'I really wanted it to work for him and have a memorable album which people wouldn't forget. I was petrified that he said yes... because I had so many ideas and I felt intimidated by my knowledge of the work that he had already done.'

Pitching down at London's Trident studios under the watchful eye of engineer Ken Scott, Bowie and his

## LOU REED-TRANSFORMER

**SIDE 1**  
Vicious  
Andy's Chest  
Perfect Day  
Hangin' Round  
Walk on the Wild Side

**SIDE 2**  
Make Up  
Satellite of Love  
Wagon Wheel  
New York Telephone Conversation  
I'm So Free  
Goodnight Ladies



All songs written by Lou Reed  
Produced by David Bowie and Mick Ronson  
Song Arrangements: Lou Reed, David Bowie and Mick Ronson  
String and Bass Arrangements: Mick Ronson  
David Bowie, Mick Ronson and The Thunder Thighs, vocal backings  
Lou Reed, Mick Ronson, guitar  
Klaus Voormann, Herbie Flowers, bass guitars  
Herbie Flowers, string bass  
John Halsey, Billy Daniels, Ronnie Thomas, drums  
"Goodnight Ladies" arranged and played by  
Herbie Flowers and some of his friends  
Herbie Flowers, tuba  
Romeo Ross, Dariusz Gos  
Mick Ronson, piano and recording  
By courtesy of RCA Records Ltd

Mixed by Ken Scott, Mike Stone, Lou Reed, David Bowie and Mick Ronson  
at Trident Studios, London, England  
Tape mastering by Arun Chakraverty  
Lou Reed managed exclusively by Fred Heley Management Enterprises  
42 Cedar Street, SoHo, New York 10013 (914) 693-5000  
An RCA Group  
Cover Art  
Black and White

RCA LIMITED, RECORD DIVISION, RCA HOUSE, CURZON STREET, LONDON W1



Ziggy cohort, guitarist Mick Ronson, were installed as co-producers, with session bassist Herbie Flowers and drummer John Halsey brought in on standard Musicians' Union day-rates.

**'Reed couldn't understand a word that Ronson said'**

Halsey remembered: 'It was really good fun, I really enjoyed myself in the studio. I can't remember ever seeing [Reed], actually, but he was somewhere in the gloomy corner, dressed in black.'

Bowie and Ronson's influence on the outcome of the album cannot be overstated. Ronson was the primary session man, contributing its memorable guitar sound, as well as piano, recorder and backing vocals. He also arranged the lush strings for 'Perfect Day'. ☺

## PRODUCTION NOTES

History notes that relations between the artist and his co-producer Bowie became strained at times during the recording, but there is no denying the spectacular results.

Engineer Ken Scott, who had collaborated with Bowie on Ziggy Stardust, recalled: 'The whole set up for this was to try and make it a lot more basic than a lot of the Bowie things we had done in the past. We just started off with bass, drums and guitars, and some of the tracks had more overdubs than others. [*Vicious*] was kept sparse. There was an effect we tried that I don't think was used in the mix at all but it's still in the multi-track – it's backwards echo.'

Musician Herbie Flowers started out using an upright bass to create the famous walking bassline for *Walk On The Wild Side*, and was then given permission by Bowie to double-track it with an electric bass.

Flowers said: 'There was a crafty little thing that us session musos used to get up to, that the recording rate was £12 for three hours but if you overdubbed, you got double the money. I put the double bass down first with the guitar and drums, then asked Ken if I could go straight back down and overdub the electric bass in tenths, just to give it a little bit more atmosphere or character.'

Scott remembered how the track acquired its jazzy time signature: 'The drummer was told kind of what was wanted and he started playing it with sticks. I was upstairs in the control room and it sounded like a march. So I just quickly dashed down and told him try it with brushes. It stuck, everyone liked it and this is how it finished up.'

A 16-track desk was used throughout the recording, apart for the album's shortest song, 'New York Telephone Conversation' – a seven-track mix featuring just bass, cymbals and piano, plus Reed and Bowie on vocals – all cut live in a single take. The album's gloriously drunken-sounding closer, complete with Oompah band commissioned by Bowie, came together as the session was 'running out of steam', according to Flowers, who got to blow the tuba alongside some expert Dixieland trombone and trumpet. A clever ending to a remarkable record.



Ronson recalled meeting Reed in New York for early discussions on the album: 'He would sit and play a new song and try and put it on a little tape recorder. He was so laidback; he would walk in the studio and like... "hey"... he would sit down in a chair, put his guitar on... it would be all out of tune... I would wander off and tune it up a bit, and Lou used to look at me and like... "hey, OK"... he didn't really care whether it was in tune or out of tune. He just wanted to sing the song.'

Reed said: 'With Ronno and David there was a real 'simpatico'... The thing with Ronno was, I could very rarely understand a word he said. He had a Hull accent and he would have to repeat things five times but... a great guitar player and a really sweet guy.'

**URBAN ROOTS**  
Despite its London recording base, emotionally

*Transformer* is rooted very much in the urban decadence of Reed's New York, specifically Warhol's Factory. It sets out its stall as a take-no-prisoners, rock 'n' roll ride, right from the crashing opening chords of 'Vicious' – a song inspired by a conversation Reed once had with his former mentor. 'Warhol said, "why don't you write a song called 'Vicious?'". I said "what kind of



vicious?'. He said "I hit you with a flower". I said "what a great idea".'

An undercurrent of violence exists throughout 'Andy's Chest', another Warhol-referencing track, described by Reed as a love song. It chronicles an attempt on Warhol's life by his former protégé-turned-proto feminist Valerie Solanas, who shot and wounded the artist in retaliation for his supposed rejection of her.

Factory life is also documented on 'New York Telephone Conversation', an affectionate portrait of the small group of artists, aesthetes, drug addicts and dropouts who formed their identities in the back room of a club on Manhattan's Park Avenue.

The uneasy tension at the

heart of the record peaks on 'Satellite Of Love', a superficially pretty song with a brooding subtext. A similar sense of longing simmers beneath

**"Walk On The Wild Side" stormed the UK singles chart'**

the surface of the elegiac 'Perfect Day', a No 1 single 25 years after it was written. Juxtaposing lyrics of self-doubt and the subtlest of melodies, it floats moodily around Mick Ronson's serene strings and melancholy piano.

The album's pivotal moment remains 'Walk On The Wild Side', an everyday tale of Factory dilettantes inspired by a Nelson Algren novel about down-and-outs in the old French quarter of New Orleans. Reworked to reference a cast including Warhol sidekicks Candy Darling, Jackie Curtis, (Little) Joe(y) Dallesandro and a San Franciscan dug hustler known as Sugar Plum Fairy, its most famous protagonist was transsexual actress Holly Woodlawn, immortalised in the song's intro, 'Holly came from Miami, FLA...' References to Holly

Just a selection of the vinyl releases from different territories over the decades: (l-r) original UK release, contemporary Canadian release and an international re-release from the 1980s

Engineer Ken Scott (right) pictured in LA's EastWest studios, with owner Doug Rogers; it was Scott who suggested the drummer switch from sticks to brushes when playing 'Walk On The Wildside', giving the track its now legendary jazz feel

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# Alternate Format Discography



➔ 'They're just songs' Reed said later on the impact of the LP

'giving head' went largely unnoticed in the more innocent days of 1972, and the song picked up airplay around the world, including on BBC Radio 1 where Johnnie Walker made it his Record Of The Week.

It stormed the UK singles chart (with a throwaway 'Perfect Day' on the B-side). Reed knew he had broken new ground lyrically but was bemused by its success: "Wild Side... be a hit, you gotta be kidding... no. But I never thought about anything being a hit.'

## IN CAMERA

Photographer Mick Rock took the cover shot featuring Reed daubed in ghostly white Japanese face make-up. For Rock, the sleeve distils Reed's decadent vision: 'Lou is guilty of expressing a certain area concerning deviant sex and drugs in such a brilliant way that it did deflect a lot of what came after, and it did form people's image of him.'

Originally the back cover was being touted for the main shot, but the images of a sexually available woman and Reed's friend Ernie with a banana down his jeans were deemed more suitable for the rear, leaving Reed having to deny rumours that he was either – or both – of the individuals pictured.

In little more than a year, Lou Reed had gone from his darkest post-Velvets days to unexpected pop stardom, but he was characteristically dismissive of *Transformer's* impact: 'It's just a little moment in time that's fun to record, but it's just this very ephemeral thing that happens... when you are not there any more. I was just writing about people I knew and where I had come from. I mean, it's just an album, they're just songs. You do an album, then you have the rest of your life.' ☺



## ORIGINAL LP (1972)

The ghostly white figure of Lewis Allen Reed, his blackened eyes staring out blankly from the cover [RCA Victor LSP-4807], was a striking, somewhat unsettling image that signalled the dawn of a decadent new aesthetic in the fermenting pre-punk scene. From the outset Reed collectors were faced with a challenging and costly task to get their hands on all the pressings of the record – *Transformer* was released with subtle variations in six territories – the UK, US, Canada, Greece, Germany and France. Reed joined stablemates Elvis Presley and David Bowie on that famous orange label, but in retrospect the quality of some RCA pressings from this time is not universally loved by audiophiles. The LP's huge success means it is still relatively abundant, and mint original copies can be found for £8-£10.

## 8-TRACK CARTRIDGE (1972)

The US release of *Transformer* on 8-track [RCA P85-2095] somehow sits nicely with the retro-cool notion of this cult collectors' format – you can almost see the hucksters and hustlers riding the mean streets of New York, blasting 'Walk On The Wild Side' out of their Pontiacs and Corvettes in an era of *Superfly* and blaxploitation movies. Whether it felt quite the same in Kettering and Maidstone is debatable, but nowadays this



item can be hard to track down, especially in the UK. The nature of the format meant it was divided into four 'programs', and the sequencing is quite different to the LP, dividing 'Wild Side' across programs into 'Part 1' and 'Conclusion', and concluding with 'Satellite Of Love' rather than the more natural denouement of 'Goodnight Ladies'.

## CASSETTE (1981)

The continuing popularity of Reed and his former comrade-in-arms David Bowie into the 1980s, fuelled by a new generation weaned on punk rock, meant that RCA's European pressing plants were in overdrive reissuing albums on the RCA International imprint. This item, [NK 83806], was manufactured in Germany and distributed widely throughout the low countries, France and the UK. It might well have been the perfect accompaniment to that decade's equivalent of the iPod – the legendary Sony Walkman. The reputation of the tape cassette has not fared well among the sonically astute, however, and this now has a nominal value of a few pounds.

## FIRST CD (1982)

Depending on your luck and the mastering process, early CDs were either loudly cut gems or poorly executed digital transfers. This German-made CD, [ND83 806], probably falls more into the latter category but did not prevent music lovers from devouring it in their many thousands, eager to experience this bright new dawn in recorded sound. The artwork stayed true to the original, as it has done without exception in the case of Mick Rock's memorable sleeve – why mess with a classic? A US CD issue was released by RCA in 1986, [PCD 14807].

## HMV EDITIONS (1988)

UK collectors were treated to limited boxed versions of the album by the high street chain (which did a similar job with other classic titles including The Beatles catalogue). *Transformer* fans could choose from CD or LP formats, in LP-sized hard-cover boxes [see top right], each featuring a 12-page colour booklet with photographs and biographical details and individually numbered.

Each item in the catalogue was limited to 2500 copies, and on the market today should realistically fetch at least £25.



## AUDIOPHILE CD (1995)

The mid-'90s saw the first of a slew of remastered issues, including the 24 Karat Gold Disc made for US stereophiles [RCA, BMG 07863 66600-2]. Restored by Bill Lacey and engineered by Mike Hartzy, it was reworked from the original analogue master and multitrack tapes, and featured 'deluxe' packaging with liner notes and lyrics – heralding the beginnings of what we now take for granted in terms of improved audio content and upgraded packaging.

## 180 GRAM LP (2004)

*Transformer's* first outing at the high-end vinyl lover's favourite weight came as long ago as 2001 with a US pressing [RCA, S125007]. Similar creditable versions have appeared recently from Europe, but for many analogue-loving audiophiles the definitive re-master is this German-made reissue from Speakers Corner Records, a brand that can almost invariably be relied on for quality control – and quality of sound ([www.speakerscorner.de](http://www.speakerscorner.de)).

## MISCELLANEOUS

By now we have established that *Transformer* is one of the most reissued, repackaged, reappraised records in rock history. In short, such variety is difficult to encapsulate, but before we say 'Goodnight Ladies', honourable mentions must go to a US 25th anniversary edition [BMG Special Products, 44541-2, 1997]; Japanese CD (mini LP-style packaging) with bonus unreleased acoustic demos [BMG, BVCM-37726, 2006]; and last year's limited European issue in a tin box [RCA 88697546622]. We await the 40th anniversary celebrations with continued glee.

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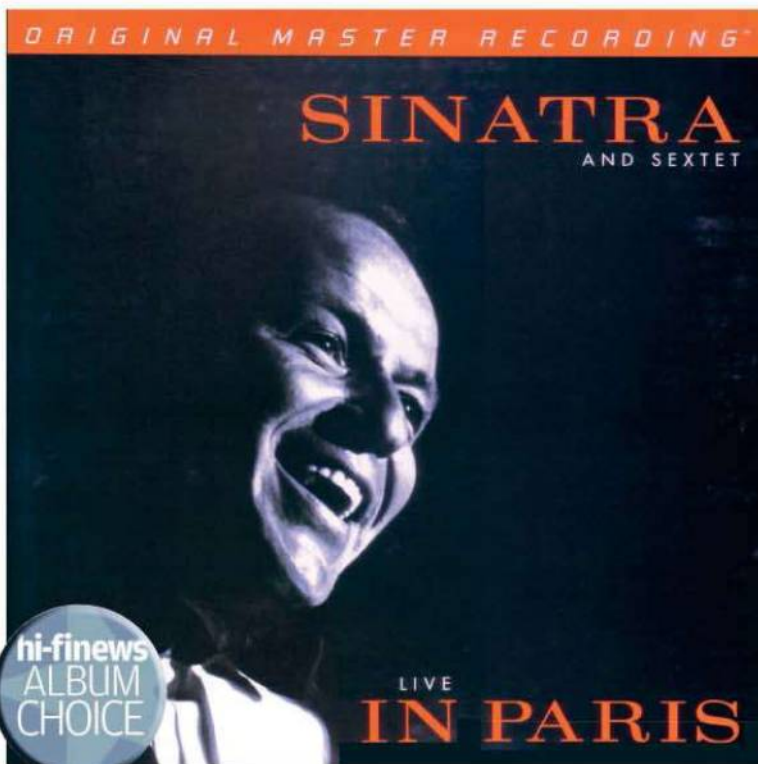
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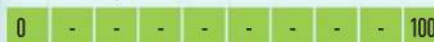
FRANK SINATRA AND SEXTET

Live In Paris

Mobile Fidelity MFSL 2-312 1 (two discs, 180g vinyl)

If anyone ever shows doubt when you extol the genius of Sinatra, this set is an argument-ender like no other. He charms the audience of the Paris Olympia, backed by a sextet made up of studio maestri, working with him through 26 standards – all of which he makes his own. He turned to Gershwin, Porter, Harburg, Lerner & Loewe, Arlen, Mercer, Rodgers & Hart, Hammerstein and others of that celestial calibre, for 'A Foggy Day', 'I've Got You Under My Skin', 'April In Paris', 'Come Fly With Me', 'One For My Baby' – not a single song on the two LPs drops below the rank of masterpiece. And oh! Does he swing! Dating from '62, it's Frank at one of his peaks. Savour it like no other live album you'll ever own. **KK**

Sound Quality: 93%



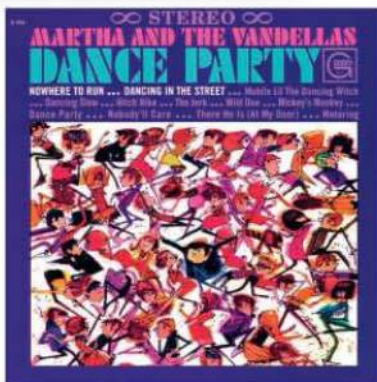
EDDY BOYD

7936 SO. RHODES

Pure Pleasure/Blue Horizon 7-63202 (180g vinyl)

For anti-purists who love all of those early 1960s sessions, when recently-discovered blues masters played with the earliest exponents of the British Blues Invasion, this is an absolute treat. It dates from January 1968, by which time the pairing of oldsters with the newbies was in decline. Producer Mike Vernon backed pianist Boyd with no less than the Fleetwood Mac triumvirate of McVee, Fleetwood and Green. Previously only available in mono on vinyl – a rare BGO CD reissue now fetches around £30 secondhand – this first-ever stereo LP issue is prime Chicago blues that ranks with the best of the vintage/British pairings. And Green's guitar work is exquisite. **KK**

Sound Quality: 84%



MARTHA AND THE VANDELLAS

Dance Party

Speaker's Corner S-915 (180g vinyl)

For an album made up of hit singles, arguably imbued with a whiff of the cash-in in the manner of all those US Beatles albums made up of singles, this set rocks indecently well. Like the title says, it was conceived to get teen booty shaking, back in an era when the dancing at parties was vertical. And look at what Motown offered on a single slab of vinyl: 'Dancing In The Street', 'Hitch Hike', 'Mickey's Monkey', the menacing 'Nowhere To Run' (heard to good effect in *The Warriors*) and eight others in cavernous stereo perfect for setting a festive mood. An oddity, like this issue's 'Album Choice', but doubly enjoyable because it transcends the concept. **KK**

Sound Quality: 82%



TRAFFIC

Heaven Is In Your Mind

Sundazed LP5316 mono (180g vinyl)

Uber-rarity made accessible: this long-unavailable, US mono release is one of a number of packages that pass for Traffic's 1967 debut, aka *Dear Mr Fantasy*. Whatever is the 'correct' one for hardcore fans of this seminal psychedelic band is not the issue: this is a fascinating alternative because the mono sounds quite unlike the stereo. You've heard this argument with The Beatles box sets; your own passion for Traffic will determine how badly you need to hear alternate mixes of stunners like 'Paper Sun', 'Hole In My Shoe' and, of course, 'Dear Mr Fantasy'. For me, it's a must: it was playing while I lost my virginity ... right after *Born Under A Bad Sign*. **KK**

Sound Quality: 83%





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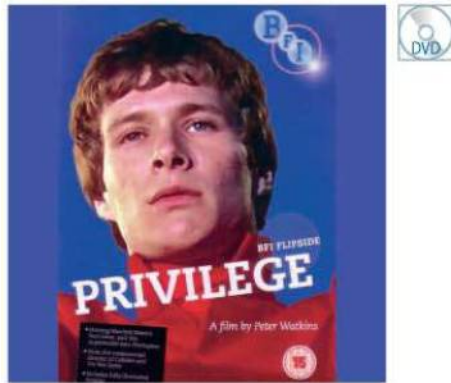
## ANJOLIE

Anjolie

Hear Music/Monster Music HMCD-30498

Little indicates that this might be anything out of the ordinary beyond the 'Monster Music' logo and mastering by the legendary Bernie Grundman. But the sonics are the first clue that this is not going to be yet another anodyne, carefully-groomed-as-if-discovered-by-Cowell, sub-soul/dance poppette. Anjolie is a Guyanese/Canadian songstress who writes her own material, and weaves into it enough strains of 'world music', light jazz, funk and whatever passes for soul in the 21st Century. But it's compelling, eerie in places, and the swing-o-meter veers more toward the excellence of Alicia Keys than any hear-today-gone-tomorrow TV discovery. *KK*

Sound Quality: 82%



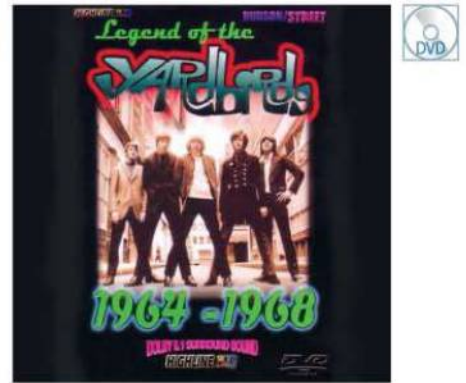
## PRIVILEGE

Peter Watkins

BFI BFVID835 (DVD)

With the release of this long-forgotten 1967 'youth' flick, one of the most important rock movies has made it to DVD. Its value has more to do with its star being Paul Jones, then ex-Manfred Mann and into his own pop career; you may know him as one of radio's finest blues experts. This film cast him as a fictional star who is manipulated by the government to influence youth. *Privilege* falls under the same general heading as other 'Swinging London' films, but with the added drama of the superior *Performance* and the tackier *Wild In The Streets*. Rest assured: crap it is not, or the British Film Institute would not have remastered it so lovingly. *KK*

Sound Quality: 77%



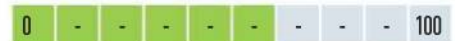
## THE YARDBIRDS

Legend Of The Yardbirds

Hudson/Street HSDVD 9936-9 (DVD)

Ordinarily, I shy away from thrown-together rock histories of dubious origin, even when it involves all-time-faves like The Yardbirds. But this collection of live clips, despite faults like muddy transfers, contains so many rare moments that it deserves consideration by the hardcore fan. The clips cover the band's entire career, even containing their moment in Antonioni's *Blow-Up*, but there's no annotation, so you need to do some homework to find out where the performances originated. And the last half-hour is early Led Zeppelin, so you might feel short-changed. That aside, there's footage I'd never seen before, so my £7 was well-spent. *KK*

Sound Quality: 60%



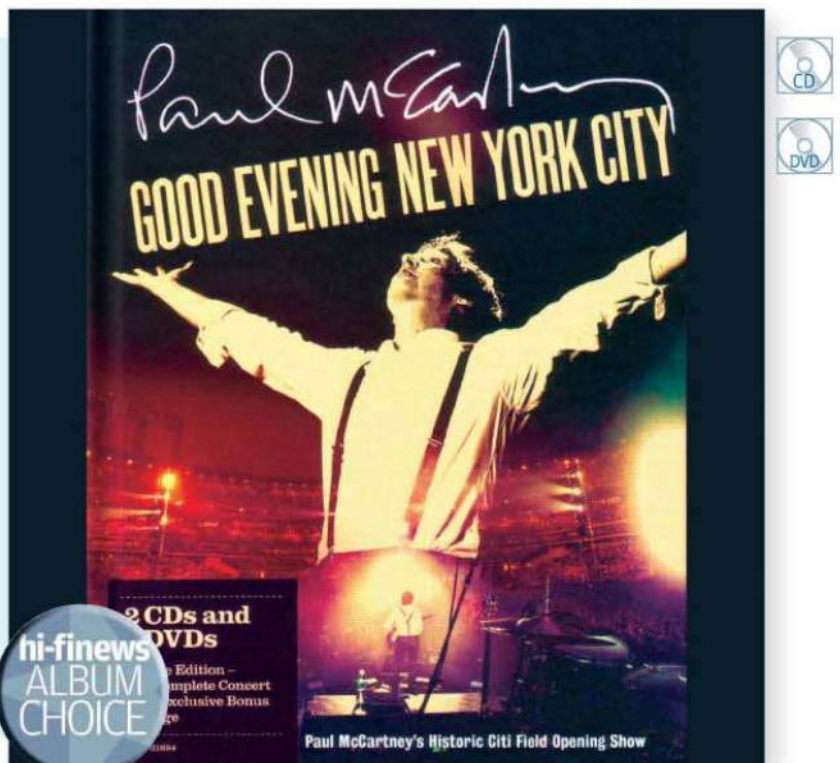
## PAUL McCARTNEY

Good Evening New York City

Hear Music/Universal HRM-31884 (four discs: 2CDs + 2DVDs)

Rumours have started that Macca is performing at assorted venues from his past because his latest, or next tour may be his last. If the energy demonstrated in this set is anything to go by, he's got years ahead of him. But if the nostalgia trip is true, and he is retiring, what better gig could there be to package on four discs than Shea Stadium? He played it with The Beatles in '65; here he is in 2009 running through 33 songs spanning his career, filling two CDs and a DVD of the entire gig in Dolby Digital Stereo or DTS 5.1. The fourth disc? The concert he played on the marquee of the Ed Sullivan Theater in Manhattan, for David Letterman. Content, sound quality and picture quality – a perfect souvenir. *KK*

Sound Quality: 90%



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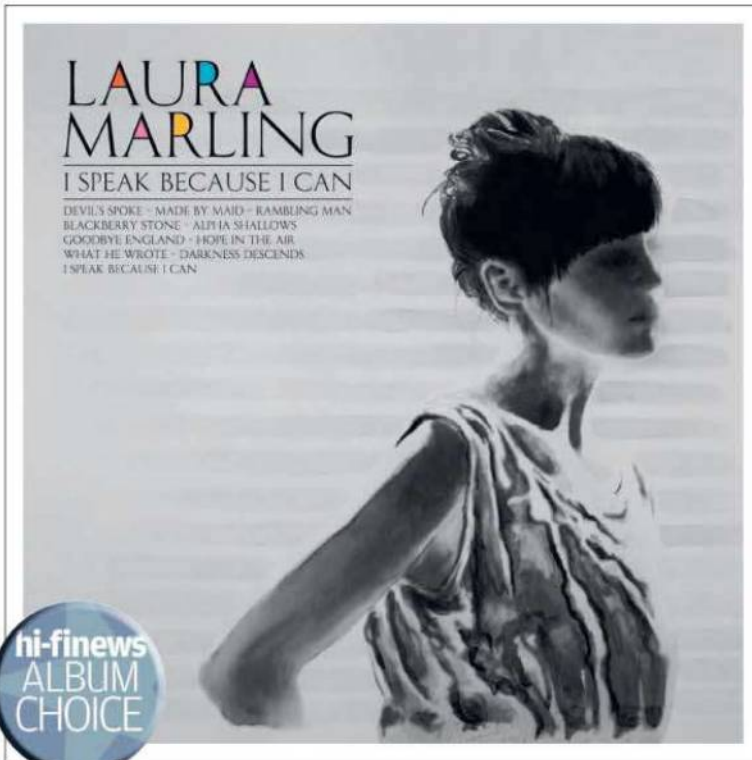
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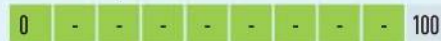
### Laura Marling

*I Speak Because I Can*

Virgin CDVX3075 (CD or CD/DVD Special Edition)

Laura Marling didn't feature at the BRITs this year, but she's currently the most compellingly interesting young songwriter in the UK, streets ahead of the more loudly trumpeted competition. Her second album more than fulfils the promise of her debut, from the cataclysmic folksy firestorm of the opening 'Devil's Spoke' to the appropriately angry dissonances of the title track closing the set. Recorded pretty much live in the studio, there's an intimacy and immediacy to this CD that particularly suits the swirling 'Alpha Shallows' and the tenderly pastoral 'Goodbye England'. With a band that includes most of Mumford And Sons plus Noah & The Whale's Tom Fiddle, this album could give folk a good name. *JBk*

Sound Quality: 89%



### Justin Currie

*The Great War*

Rykco RCD 11009A

The former tunesmith for those very wonderful Scots janglemeisters Del Amitri, Currie delivered a deeply and unexpectedly depressing solo debut album in 2007. Presumably he's feeling better now, because this one opens with a chimingly wistful slab of *weltschmerz* called 'A Man With Nothing To Do' and follows through with the bitterly beautiful 'Anywhere I'm Away From You'. Track 3, 'At Home Inside Of Me', with its achingly heartfelt list of life's emotional zeniths and nadirs, confirms that Currie is back in full effect as our most exquisitely perceptive songwriter. I don't want to give too much away but, trust me, it actually gets much better after that. *JBk*

Sound Quality: 91%



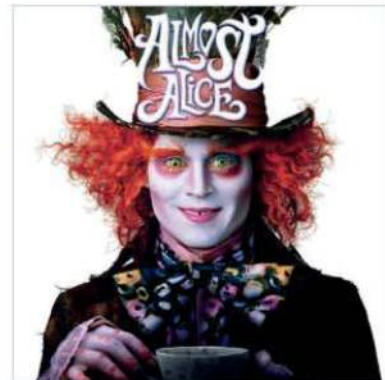
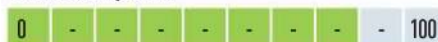
### The Black Keys

*Brothers*

V2/Co-operative VVR737197

It seems unfair to saddle these guys with the blues-rock tag that lazy journos so often apply to them, when they are in fact a unique and extremely curious hybrid of dirty industrial riffs, nuggetsy psychedelia, contemporary techno, freakish soul and, OK, a spoonful of blues. This is the sixth album from The Akron-based duo of vocalist/guitarist Dan Auerbach and drummer/producer Patrick Carney, and it's as fresh and vibrant as was their first. The swirling harmonised guitar of 'Tighten Up', the grungy thump of 'Everlasting Light' and the scarred heart intimacy of 'These Days' are just three of 15 very good reasons why you can't afford to be without this CD. *JBk*

Sound Quality: 75%



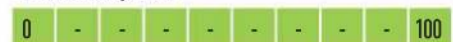
### Various Artists

*Almost Alice*

Buena Vista 6285432

There is a soundtrack CD by Danny Elfman, but *Almost Alice* features songs 'inspired by' Tim Burton's new *Alice* movie. Commercially-speaking, it's an excuse to further monetize a guaranteed big seller, but if ever a well-loved story was crying out for an album, it's *Alice*. 'Owl City', 'Metro Station', 'Motion City Soundtrack' and 'Tokio Hotel' all rise magnificently to the challenge. 'Very Good Advice', the only track from Disney's original 1951 *Alice In Wonderland*, sounds uncannily as if it was written for Robert Smith; Franz Ferdinand's take on Lewis Carroll's Lobster Quadrille is near perfect. Hell, there's even a re-make of Jefferson Airplane's 'White Rabbit'. *JBk*

Sound Quality: 94%







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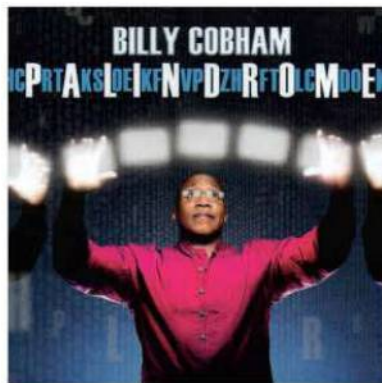
### SOMI

*If The Rains Come First*

ObliqSound OSD-CD-109

If you've read *Brave New World* recently, you might start to think this is soma rather than Somi. The New York-based African singer's sleek and glossy third album brings soporific reminders of Sade, but there is some substance as well as sweetness. Her ObliqSound label debut follows *Red Soil In My Eyes*, which provided the hit single 'Ingele' in 2007. This time, the grooves are masterminded by bassist Michael Olatuja, and on the appealing 'Enganiyani' you get guitarist David Gilmore and a guest appearance from Hugh Masekela. It's doubtful whether Somi's dreamy-sounding songs like 'Be Careful, Be Kind' will change the world, but we should live in hope. *SH*

Sound Quality: 85%



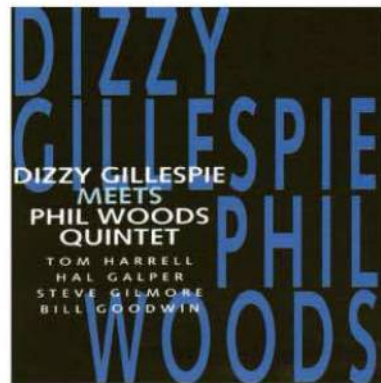
### BILLY COBHAM

*Palindrome*

BHM Productions BHM 10442

The great elder statesman of jazz-rock drumming looks back once again to the music of his earlier years, in a follow-up to 2007's *Fruit From The Loom*. But alongside the re-imagined and re-arranged numbers from *Total Eclipse* (1975), *Focused* (1997) and albums in between, there are five new compositions. Among a stellar assembly of guest artists are saxophonist Ernie Watts, trumpeter Michael Rodriguez and Marshall Gilkes on trombone, plus guitarists Jean-Marie Ecay and Dean Brown, while keyboardist Christophe Cravero also contributes on violin. Recorded sound is deep, full and punchy, with no nasty edges, making a tasty fusion of old and new. *SH*

Sound Quality: 85%



### DIZZY GILLESPIE/PHIL WOODS

*Dizzy Gillespie Meets Phil Woods Quintet*

Timeless CD SIP 250

Alto saxist Phil Woods had been in the Gillespie big band in 1956, and this recording from 30 years later captures one of his happiest reunions with the trumpet giant. On this reissue, the Dutch studio sound is still spacious, and welcoming too. As well as his long-serving rhythm section, Woods' quintet already included a great trumpeter in Tom Harrell, but Gillespie's presence lifted the group to greater heights adding another dimension to their music. His pungent muted sound makes for a memorable 'Round Midnight' and he draws Harrell into inspired two-trumpet counterpoint on a bustling 'Love For Sale'. And Woods himself is really flying. *SH*

Sound Quality: 90%



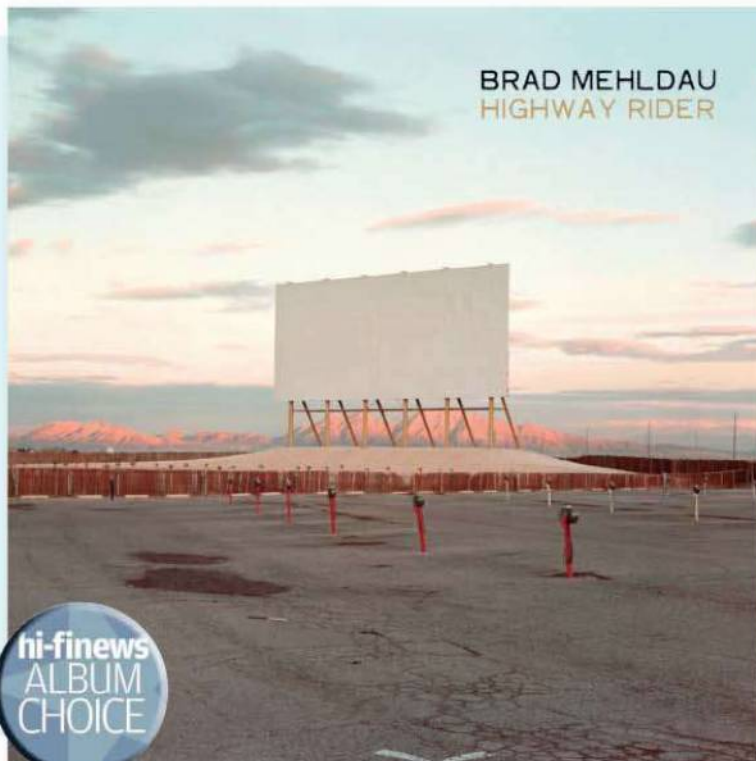
### BRAD MEHLDAU

*Highway Rider*

Nonesuch 7559 798 270 (two discs)

Mehldau's usual trio partners Larry Grenadier and Jeff Ballard are here, but that's only the start. Ballard is joined by second drummer Matt Chamberlain, there is a chamber orchestra with strings and horns and also a major role for saxophonist Joshua Redman. 'The Falcon Will Fly Again' is a journey in itself, an arc in which Redman's solo builds to a climax then calms again, over the pianist's brain-stabbingly insistent vamp figure. In the studio with Jon Brion, also the producer of his album *Largo*, Mehldau aimed to do everything live as far as possible, avoiding the trap of adding strings to a jazz group after the event. On all 15 pieces, he also uses his own virtuoso technique to create music of amazing intensity. *SH*

Sound Quality: 90%





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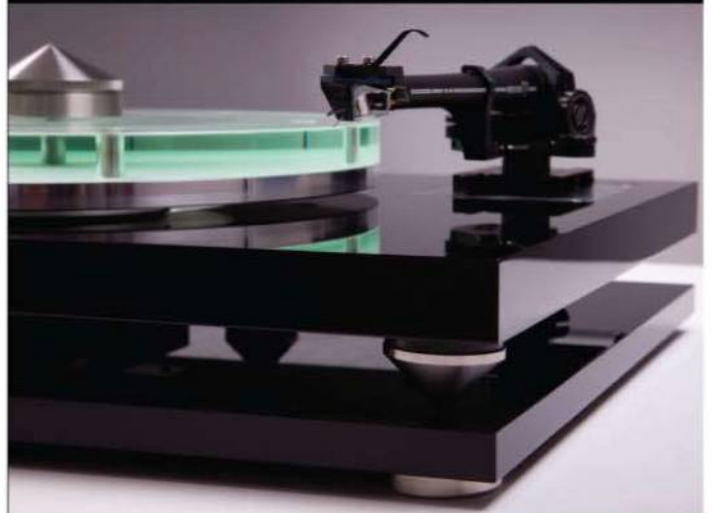
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CHICAGO SYMPHONY ORCHESTRA  
ROXANA CONSTANTINESCU / NICHOLAS PHAN  
KYLE KETELSEN / PIERRE BOULEZ



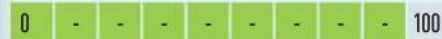
STRAVINSKY

Pulcinella; Symphony in Three Movements; Four Études  
Soloists, Chicago SO/Pierre Boulez

CSO-Resound CSOR 901 918

The four miniatures are the piquant centrepiece(s) of this live compilation – the *Études* were on Boulez's very first Stravinsky LP and there's a CSO studio alternative on DG. In the booklet interview, Boulez describes his fascination with the orchestrations but reveals his reservations over the composer's later neoclassical phase. They include the middle movement of the Symphony here, yet it's beautifully played, and the 'creative energy' of the first is impressively maintained. *Pulcinella* (complete) is perhaps more dourly presented but it has a most impressive mezzo in Roxana Constantinescu. These early 2009 Symphony Center recordings have great clarity. *CB*

Sound Quality: 87%

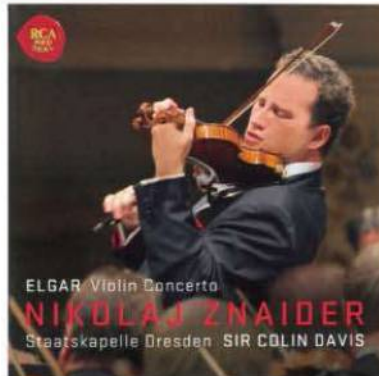


JS BACH  
Goldberg Variations  
Andreas Staier

Harmonia Mundi HMC 902058 (CD+DVD)

On the accompanying DVD, Staier gives us – apparently extemporised – many valuable insights into Bach's aims and the structuring of these keyboard variations, and we also get an idea of his extraordinary mastery of his chosen two-manual replica of the extravagantly designed 1734 Hass harpsichord, with its bold red casework. The full sonority of the instrument is unleashed in the Overture marking the halfway point (track 16) and following Staier's use of the eerie, metallic lute stop. Everything he says about the work is to be found in his performance, with its profound organisational skill. *CB*

Sound Quality: 95%

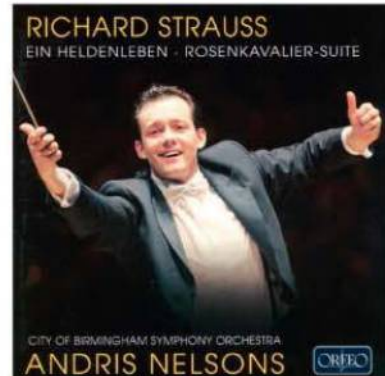


ELGAR  
Violin Concerto  
Nikolaj Znaider, Staatskapelle Dresden/Sir Colin Davis

RCA 88697 605882

The high point of this recording, where Znaider plays the Guarneri del Gesù which Kreisler used for the 1910 premiere, comes in the accompanied cadenza in the third movement. It's Davis's third and most satisfying studio version of Elgar's Concerto; and of those by non-English soloists on modern records, Znaider's interpretation – somewhat cool tonally? – best withstands repetition. But the seemingly unassailable benchmark remains the composer's own 78rpm set with Menuhin (then 16): it's on Naxos 8.110902. Perhaps Znaider studied the way the Andante was played, and overall timings are close too. *CB*

Sound Quality: 70%

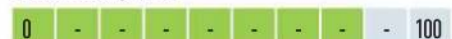


R STRAUSS  
Ein Heldenleben; Rosenkavalier Suite  
CBSO/Andris Nelsons

Orfeo C 803 091A

If you edit from three live performances, as here, is it appropriate to include applause? Should there be any at all after the reflective close of *Ein Heldenleben*? These questions aside, the young Latvian conductor galvanises his orchestra in a way that challenges even Karajan (especially identified with the work, though his 1972 RFH account on Testament isn't good). A studio recording of the hotch-potch *Rosenkavalier* suite heads this CD, and if the youthful exuberance is a shade brash, the CBSO and Nelsons still give a passable imitation of the Vienna Philharmonic or 1950s Philharmonia in Strauss. *CB*

Sound Quality: 78%





# Roksan

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Effective 1st November 2009, all Roksan electronics and turntables supplied via authorised dealers are to be covered by a 5 year parts and labour warranty.\* As a gesture to existing customers, this will also be extended to all current owners of K2 products.

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## HI-FI SEPARATES

### CYRUS



Cyrus' award-winning CD Xt SE and DAC X+ have been upgraded with a '+' suffix. In a recent review, this combination when used with 2 x PSX-R power supplies, received the prestigious 'Editor's Choice' award by HI-FI Choice magazine.

The XP amplifiers are based on the circuitry of the top of the range DAC XP+. The entry-level 6XP includes 6 line level inputs along with a

zone 2 feature while the 8XP d combines the XP series pre-amplifier with a newly revised power amp, and contains an onboard DAC for digital sources.



CDX t SE+	DAC X+	PSX-R
CD8 SE	DAC XP+	8XPd
CD6 SE	6XP / 8XP	X POWER

### MICHELL

### GYRO SE

Based entirely on the GyroDec, but without the costly acrylic plinth and dustcover, the Gyro SE brings the same qualities in a more affordable and compact package. A Gyro SE can always be converted into a GyroDec by purchasing a plinth and dustcover.



### PROJECT

### GENIE MKIII

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### ARCAM

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CD17	A28
CD37	A38
A18	P38

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CASPIAN M SERIES  
K2 SPEAKERS

### ROTEL

#### 06 SE SERIES

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### MARANTZ

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#### PM6003

The PM6003 amplifier and CD6003 CD player, come housed in Marantz's stylish 'M1' casing. The CD player features a front mounted USB socket allowing improved performance from devices

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SA-KI PEARL PM-KI PEARL

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#### TUCANA II

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STREAM II PULSE

## HI-FI SPEAKERS

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When this horn speaker enthusiast moved house, he got more than a new home. He also acquired a pair of built-in concrete horn speakers of legendary status. **Steve Harris** meets the music lover who bought his house from John Crabbe many years ago, and still makes good use of JC's famous bass horns

**W**e could have dispensed with this feature's modern 'at' sign and called this month's feature *Hi-Fi In The Home*, because there is more than a passing connection with that book's author, the late John Crabbe, Editor of *Hi-Fi News* from 1965 to 1982.

But that comes later. David's story starts when, as a schoolboy in the mid-1950s, he built himself a solar-powered AM pocket radio.

'It was a kit. In those days, a Saturday morning jaunt to browse along the Tottenham Court Road was a very worthwhile exercise. Because if you had half a crown pocket money, you had to think very carefully how you would spend it.

'I'd built crystal sets, but with this radio there was no need for a long aerial. It was powered by ex-Army solar cells. Six of those wired in series gave you the necessary voltage even on a dull day. The whole thing went into a tobacco tin. While standing at bus stops I would very ostentatiously pull out my hearing-aid earpiece and plug it in, and fiddle with the tuning.

'Later, I bought a pair of Mk 38 ex-Army walkie-talkies. I would walk in the park with my pal and we'd be busy talking to each other on these

things that must have weighed 10lb each! They worked perfectly well until their 150V batteries ran out.

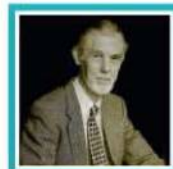
'Then, from a little transportable record player, we thought we'd look into things a bit more. After visiting the Audio Fair at the Waldorf Hotel in London, we decided that we'd get a Lowther loudspeaker. They were way beyond our budget, but Lowther would supply plans, and we could afford that.

'My friend was a good carpenter, and we agreed that if I provided the plans and materials, he would build a Lowther Acousta for each of us.

#### MASTER PLAN

'Getting these plans was quite an experience. I travelled by public transport down to Bromley, where Lowther had its factory and office. I went into the reception hall, at the end of which was a glass partition window. I rang the bell, the glass partition slammed open, and there was a serious-looking woman: "Yes, what do you want?" she said. I stammered that I wanted some plans. "You know they cost half a crown?" I said yes, I've got that. The glass window slammed shut again, and I waited. And waited.

'A man in an overall appeared and went into an adjacent room.



### Hi-Fi News



**ABOVE:** The late John Crabbe, Editor of *Hi-Fi News* 1965-1982, and the June 1967 issue of *HFN* showing his 'Mk II' bass horn under construction

**RIGHT:** Garrard 401 deck in its SME plinth, with 3009 arm and Ortofon MC20 cartridge; a Philips CD624 player can be seen to the left

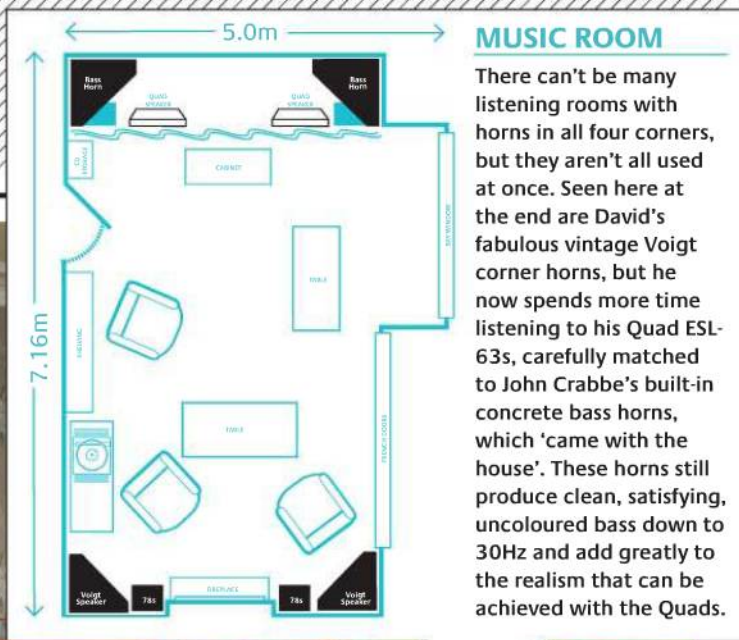


And after a few moments I heard some wonderful music, organ music. It was so wonderfully deep and penetrating! Overcoming any nervousness, I poked my head around the door and saw a horn loudspeaker in the corner.

'When I asked about it, I was told that this loudspeaker was not available to the public. It was their "testbed", the man said, in which they tried out drive units. Eventually I was called back to the glass window, picked up my plans and set off on my journey home.

'Well, the image of that loudspeaker and the aural memory of the sound etched themselves in my brain. I still remember them as clearly as anything, 55 years later!

'I duly gave my friend the plans and the Acousta cabinets were built. We decided to pool our finances and



### MUSIC ROOM

There can't be many listening rooms with horns in all four corners, but they aren't all used at once. Seen here at the end are David's fabulous vintage Voigt corner horns, but he now spends more time listening to his Quad ESL-63s, carefully matched to John Crabbe's built-in concrete bass horns, which 'came with the house'. These horns still produce clean, satisfying, uncoloured bass down to 30Hz and add greatly to the realism that can be achieved with the Quads.



'A widow had advertised a Voigt. I found the speaker with a lot of brushes stuck in it upside down. She had been using it as a broom store'

get one PM6 drive unit at a time. We took it in turns, sharing one drive unit, until we could buy the other one. But we were never destined to catch up, because, blow me down, stereo came along.

'That meant another purchase of marine ply and another pair of PM6s. But eventually we got there. My Acoustas are still in existence, a friend has them, and they still produce a very nice sound.

'But I always remembered the sound that I'd heard that day at Lowther. Although I'd found out about the music, the last movement of Widor's Fifth Organ Symphony, for

a long time I couldn't discover what the "testbed" was.

'I started following up ads for secondhand horn speakers and came across somebody who was selling one in Doncaster. My friend, who now worked for a record company, borrowed one of his firm's vans and we went up there.

**DISASTER LOOMS**

'We had a breakdown, about five miles from Doncaster. The van had overheated and we discovered that the fan pulley was missing. I then remembered having seen something spinning into the side of the road

a couple of miles back. When the police arrived, they offered to take me back to where I thought it had fallen and, amazingly, I found the pulley at the roadside.

'We put the heater on to keep the engine cool and continued on our journey. When we got there, we discovered that the advertiser was also the proprietor of the local garage! He offered to open up his workshop and spot-weld the pulley back on. Well, how lucky can you get? But there was more.

'There, in the corner of the sitting room was the loudspeaker! The same one that I'd seen about eight

**ABOVE:** Between the Voigt horns sit twin chests of alpha-labelled drawers housing a large 78 collection. These can be played with bamboo needles on David's amazing 1920s Expert horn gramophone (see inset picture)

years earlier. Of course, I would have bought it without hearing it. And that was how I discovered the Voigt Domestic Corner horn.'

## BRUSH WITH DESTINY

Now all David needed was a second one. 'I kept looking out for advertisements and followed up every one that I could. I came across home-made ones, poorly made and plain white-wood ones, painted ones and veneered ones.

'On one occasion, a widow had advertised the speaker, and she was using it as a broom store. I got to the house, and found the speaker in beautiful condition, but with a lot of brooms stuck in it upside down.

'Anyway, I acquired a total of seven Voigt speakers, and eventually, moved house, which is a story in itself.

'I'd been in correspondence with John Crabbe, he as Editor, me as a reader of his magazine, mainly on the subject of Paul Voigt. So I knew John's address.

'When I went to a local estate agent here, he asked me what I was after and I told him that I wanted a four or five bedroom house with a view. He thought a bit, and then he said, "Well, we've got some details going out this afternoon on a house

**RIGHT:** Quad FM4 tuner atop a 44 preamp. David also uses a Quad 405 power amp

**BELOW:** With throats painted white, the Voigts are illuminated to give a gentle orange glow while listening in a darkened room

**BELOW RIGHT:** In another reception room, David has Lowther TP1 speakers, powered by a Quad 33/303 amp with FM3 tuner and Philips CD100 player



that you might be interested in. Here you are, have a look."

'So I got first bite at this house, and went round to an address that I already knew. I saw John Crabbe's wife initially, agreed the asking price, went home and told my wife. And only mentioned in passing that it was John Crabbe's house, and had one or two interesting features!

'My wife then thought that I wasn't buying a house, I was buying a pair of loudspeakers! And of course these loudspeakers were built into the two corners of the music room behind the curtain.'

## BACK IN TIME...

John Crabbe had described the design and construction ten years earlier, in the October and November 1967 issues of *Hi-Fi News*, after a picture of the system had appeared on that year's June issue cover. He later replaced the horn mid and treble section with a more modern boxed speaker arrangement, described in the March 1972 article 'Tip Top Top', creating the 'Mk III' loudspeaker.

'The bass horn is 12ft long, with the drive unit at the top corner of the room and the mouth at the bottom, consisting of breeze blocks cemented in place and wired into position, so the thing was absolutely rigid. And it produced a very deep bass that went down cleanly to 30Hz, without any resonance.'

'Well, it took six months, but eventually we exchanged contracts

just before Christmas of 1977. It wasn't until later that I discovered during those months, John Crabbe had been gazumped three times! But he still kept to the price that we had originally agreed.

'We moved in during the snow of January 1978. It was all excitement. The first thing was to connect up the

music, because you must have music while you're doing everything else. I was torn between the Voigts and the

Crabbe horns. I knew the Crabbe speakers were better in a number of respects, but I kept that for discovery later, and connected up the Voigts first. I'd now sold five of the seven Voigts and kept the two best veneered ones for the new home. We're looking at them now.'

Used alternately with the Crabbe horns at the other end of the room, ☺

*'We moved in and it was all excitement'*





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RIGHT: With a KEF B139 drive unit at the top, the Crabbe bass horn can be seen tapering towards the large mouth at the bottom. Mounted above this is John Crabbe's IMF-based mid/treble cabinet with KEF and Celestion drive units, though this is no longer used

the Voigts have remained in position ever since. Meanwhile, David had changed from the Garrard 301 to the 401 which he has now, in its beautiful SME plinth, with SME 3009 arm and Ortofon MC20 cartridge. He'd also progressed from Quad valve amplifiers to the 33/303 and finally to a Quad 405, which he bought from John Crabbe.

'One thing you can do with the Voigts, is that you can have your head two feet away from the mouth of one loudspeaker, and still hear the other one. Because they are omnidirectional and a point source, your head isn't locked in a critical position. They are very good for staged opera and shows and so on.'

**LOWTHERS TOO...**

Knowing that David also has a pair of Lowther TP1s in another room, I asked him why he'd acquired these when he already had the Voigts.

'I wanted to try Lowther's top drive unit, the PM4, with my Voigts, but it was an atrociously high price and with a young family I couldn't afford it. But what I did see advertised one month was a pair of Lowther Audiovectors, with PM4s, located in Essex. So I bought them. The idea was that I would try the PM4s in the Voigt horns and sell the cabinets on, which I did. By doing that, the PM4s cost me far less than if I had bought them separately.

'But I was very disappointed with the PM4s in the Voigt horns. They didn't give any feeling of bloom or



warmth in the bass, they produced a very cold sound. When I discussed this with Donald Chave of Lowther, he agreed. He said it was because the cone was controlled too much by the very high-flux magnet. You needed a bit of sloppiness to activate the "bass chamber".

'Now, this is anathema really, to somebody who is listening to electrostatics, where you don't have any sloppiness in the diaphragm. But subjectively, you got a better sound with the lower-flux magnet PM2s. And music is subjective.

'So I passed the PM4s to John Howes of The Audio Jumble, and in exchange he arranged to get me a pair of new PMXs, which I now use instead. Now, the Voigt is a compound horn arrangement for the mid and treble range, but it's not, strictly speaking, a horn for the bass. It is a tapered pipe, if you like, a section or part of a horn, but it works in a slightly different way.

'An organ pipe is tuned by length to one frequency, and has straight walls, sometimes with an exciter at one end. The Voigt "pipe" has been de-tuned, firstly by the flare, and because the exciter, in this case the drive unit, isn't at the end but is a third of the way down from a closed stub, which reduces third and fifth harmonic distortion.

'This "bass chamber" was a very important development, patented by Voigt in the 1930s and later copied by many people, with and without permission.

'Nonetheless, it relies on a broad resonance to augment a



fundamental, and that is, if you like, a lessening in the purity of reproduction in the Voigt. But that is being very pedantic, because I come back to the fact that music is subjective and subjectively, the Voigt is a very satisfying reproducer.

'Because of the incisivness of the Lowther's shorter horn, I had experimented with a smaller horn to act as a tweeter with the Voigt. I experimented with various contours and even at one stage thought that I would use a pair of Lowther TP1s, take the legs off, turn the cabinets upside down and fit it on top of the Voigt. My wife talked me out of this!

'But in the meantime, of course, I had bought the TP1s. They were now slightly surplus, but fortunately



RIGHT: Bought secondhand, David's Quad ESL-63s came with strong metal stands, loaded with lead shot. They are normally concealed behind the white curtain



we had another reception room, where I was able to accommodate them. Just! I really don't do them justice where they are now.'

**INTEGRATED QUADS**

More recently, for the main room, David acquired a pair of Quad ESL-63 electrostatics, which he has placed in front of the Crabbe horns.

'I proposed to John Crabbe that I would like to integrate his original 12ft horns with Quad ESL-63 electrostatics. He jumped at that as a good idea and gave me every assistance in how to alter the

crossover units and to amplify the two signals separately. And it was while this process was going on that, sadly, he died. But I still have his meticulous instructions as to how to achieve this modification.

'Later I discussed this with John Howes. He suggested a different

approach to get the same result. He kindly let me have a graphic equaliser, I bought a second Quad amp, and we've got a very

satisfactory sound. The ESL-63s are very "scientific", some would even say produce a cold and calculated sound. But really all they need is a

*'All the '63s need is a little bit more bass extension'*



FIG. 87 End of the author's sitting room, showing cabinet used to hide loudspeakers, a 2000 grey flourescense essential (type "U-1000" Chorned) by 805) perforate the main hall of reducing light transmission while remaining transparent to sound, a formal symphony delivered on occupying the design.

substantial collection of exlre discs would be wise to age them for an additional disc... the latter... as an additional disc...

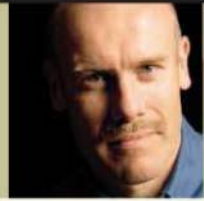
little bit more bass extension. The latest big Quad electrostatics have solved this, but I've tackled it by combining the smaller '63s with the John Crabbe horns. As you can see, they blend in very well.

'John Howes helped me connect it all up. He came here, rolled up his sleeves and got me listening to music again! Indeed a friend in need!'

**ABOVE:** The Crabbe horn speakers and (left) the room pictured in JC's 1969 *Hi-Fi In The Home*

**BELOW:** Classic Voigt drive unit





**Paul Miller**  
Editor

Technician and writer on all things audio for over 25 years, Paul Miller took over the editor's chair in 2006. He invented the QC Suite, used across the audio industry

# Enthusiasts' call to arms

Can the construction of a tonearm have a greater impact on the sound quality of pick-up cartridge and turntable than the accuracy of its alignment? Quite possibly, says **Paul Miller**

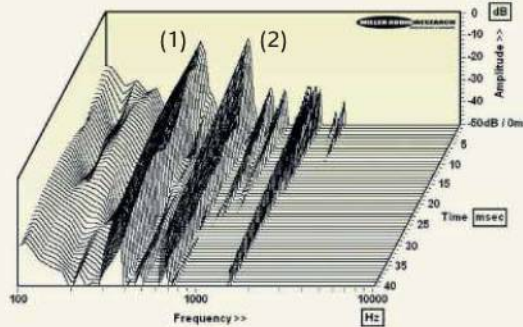
**T**onearms are often treated as the poor cousin in vinyl replay's ménage à trois. After all, the pick-up cartridge and turntable both have direct contact with the precious black disc while the arm, well, it's just the go-between, right? Not exactly for, as this month's group test demonstrates, your choice of arm will fundamentally alter the presentation of both deck and pickup.

The fact we've seen little detailed technical analysis of tonearm behaviour in the past has not helped the cause. A modal analysis of these pivoted pipes is a tricky job without the requisite software. Fortunately, I've just written us some...

## JOB DESCRIPTION

All seasoned vinyl fans understand the need to match cartridge compliance to the arm's effective mass to avoid resonance with warped LPs or, at the other extreme, subsonic groove detail. This done, then what's left for our arm but offer the correct alignment, downforce and bias to optimise the pick-up's tracking of the LP groove?

In practice, few tonearms offer the inert platform required of our precious MM and MCs. In truth, the little beggers bend, ripple, twist and even expand and contract in response to noise (vibrations) from the body of the cartridge, acoustically (from the speakers) and up through the armboard of the deck itself.



**ABOVE:** Cumulative spectral decay of main resonances (1, 2) within the SME IV tonearm

Sure enough, this is all happening on a microscopic scale but so are the movements of the stylus as it traces out the finest of groove modulations. If the arm moves relative to the stylus then the recovered audio is modulated adding 'color', musical or otherwise. The cumulative resonant decay plots that accompany our reviews illustrate this.

## MODES & ROCKERS

Modal analysis allows us to describe the dynamic behaviour of the tonearm – its various resonant frequencies, damping and mode shapes – because we are able to directly compare the 'output' of the arm

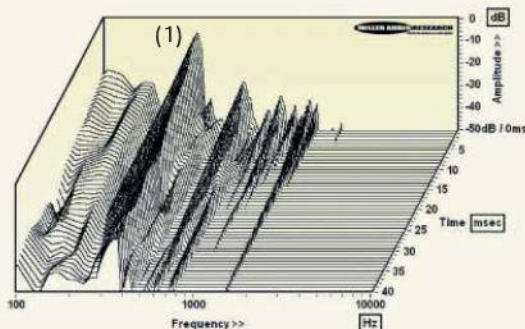
with the response of a mechanical 'input'. The natural frequency of the arm is proportional to its mass and stiffness but is readily 'tuned' by your choice of cartridge and compliance of its mounting to the deck. A heavier cartridge can result in a greater deflection during resonance and a lower overall resonant frequency for the arm itself. This may influence our perception of upper bass, for example. Similarly, a wooden armboard may offer a degree of decoupling that's distinct from, say, the solid alloy plate of an unsuspended deck.

In practice, a typical 9in alloy armtube bends at anywhere between 100-400Hz

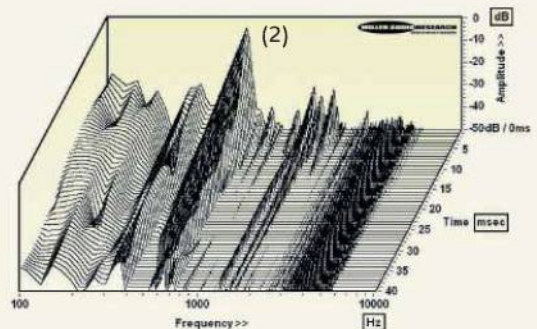
with secondary bending modes, torsional and hoop modes appearing up to a few kHz. Altering the symmetry of the tube, either by varying the wall thickness and/or its

'The little beggers bend, ripple, twist and even expand and contract'

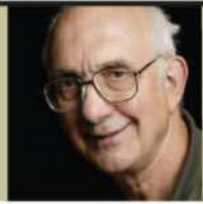
overall diameter (as in the case of SME's IV, illustrated here) pushes the modes to higher frequency while an S-shaped tube distributes the peaks still further, trading a few defined modes for a complex mix. So next time you read a review chasting a pick-up for one coloration or another, checkout the choice of tonearm. ☺



**LEFT:** First-order 'diving board' bending mode (1) occurs at a relatively high 320Hz with the SME IV thanks to its rigid tube



**RIGHT:** All arms exhibit multiple bending modes – the resonance at 600Hz (2) is excited more by noise travelling up the SME IV's mounting pillar



**Barry Fox**  
Technology journalist

Barry Fox trained in electronics with the RAF and worked as a patent agent, but he gave that up to enter journalism. He is one of the world's top technology writers

# Throwing away the key

With companies offering studio master quality 24-bit downloads online, who needs physical discs anymore? Well, just wait till the day that your virtual music becomes inaccessible, says **Barry Fox**

**T**he death of CD? Linn asks us to ponder, heavily loading the question by declaring that 'the dramatic decision to cease production of CD players from the start of 2010 to focus on digital music streaming systems (is because) high quality digital streaming proves to be the future of music in the home.'

Linn went late into CD because founder Ivor Tiefenbrun long preferred the sound of vinyl on a Sondek to anything digital. He was so outspoken on the shortcomings of early CD players that when I interviewed him for a music programme on the BBC, the producer dared not broadcast the tape.

Come to think of it, Ivor's feelings then pretty much match what I feel now about the demos of home 3D TV that are as unpleasant to experience as the early demos of ping pong stereo and mixed doubles quadrasonic surround.

**16-BIT EARS**

Son Gilad Tiefenbrun, who has a computer background, now runs Linn and has been selling top end digital servers and DRM-free Studio Master 24-bit downloads for a couple of years. Ditching CD may well make sense for a specialist company like Linn, which is serving 24-bit ears. It also makes sense for people with MP3 ears who want the very latest pop singles to play through earbuds, and who then quickly lose interest in the songs. It's the rest of us, with 16-bit ears and long term music collections, who need CDs either to play or copy to hard disk.

I recently suffered first hand experience of what can go wrong with collecting music by buying downloads. Take heed. I had signed up to Apple's



**ABOVE & RIGHT:** Creating an account and downloading music from the iTunes store is easy – except for AOL users, who were recently prevented from accessing the site, and their cash credits

online iTunes store, mainly to test the service. Because I use the AOL email system I took the easy option offered of using my AOL account name for iTunes.

When I found that some jazz recordings I wanted were unavailable as CDs, I bought the tracks as iTunes downloads. I also bought some music movie material.

At the end of 2009, Apple and AOL fell out and iTunes users with AOL accounts were forced to convert to iTunes accounts.

The process was easy and my credit card details were automatically transferred. But all the cash credits I had accumulated from iTunes vouchers disappeared. So Apple could preserve the means to charge me, but not what I was owed. What a surprise.

Perhaps because I had upgraded my PCs to Windows 7, iTunes DRM copy-protection also locked up my purchased music and movie material and threw away the key.

Contacting iTunes Support wasted hours and produced only gibberish and contradictory advice that ran me ragged in circles. Even after enlisting help from

With an iTunes Store Account, you can download the latest music, videos and more.

To begin creating your iTunes Store Account, click Continue.

Cancel Continue



AOL screen names can no longer be used with the iTunes Store.

To continue using the iTunes Store, you must update your iTunes account by creating a free Apple ID.

Cancel Update Account

Apple's press office, it took many weeks and very many emails to get my credits back. I still can't play the music and movies I purchased.

**WHO DOES IT HELP?**

I will never again buy music by download if it is DRM-protected, and thus can't be easily copied to blank CD or DVD for safety. So it will be much easier for me to buy on CD in the first place, and copy from there to a home server.

Even the music industry, which for years sapped consumer sympathy by rag-bagging home copying with commercial piracy, has now had a sanity check. Says trade body the IFPI: 'Even in countries like the UK, where there is no exception from copyright law for private copying, no one will be prosecuted by the music industry for doing this kind of limited copying for personal use.'

But for us to play this sane game, the record companies have to go on pressing CDs, or make all downloads DRM-free. Indeed Linn is continuing to press CDs and SACDs and doesn't use DRM. What puzzles me is why Linn thought it wise to declare CD dead and dramatise the decision to stop player production. Who does that help? ☹

*'iTunes DRM locked up my purchased music material and threw away the key'*

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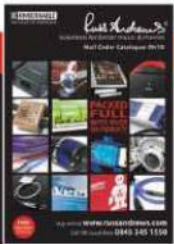
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## Barry Willis

Journalist for top American audio-video publications

While his main interest is high-end audio, Barry Willis also writes about the culinary industry, visual art and theatre for a huge variety of US newspapers and magazines

# 21st Century sounds

Marketed as the last box you'll ever need, all-in-one music servers are beginning to appear thick and fast. **Barry Willis** spends time with an upmarket offering from the US, and likes what he hears

The Olive Musica debuted a few years ago, represented a new genre of audio product – the music server, a hybrid of computer, CD player and CD burner. A versatile, good-sounding pioneering device, the Musica was hampered by a smallish hard drive, low-contrast black-and-white screen, and sometimes counter-intuitive operating system. Shortly after its release, San Francisco-based Olive promised to deliver a series of music servers with sleeker operation, larger storage capacity, and truly audiophile performance.

The Opus series fulfills that promise, and more. The Opus 4 HD is as delightful and stylish a piece of gear as I've brought home in a long time. With a raking front (easier to use on desktop or coffee table), a high-resolution colour touch-screen with just the right degree of sensitivity, enormous hard drive space, and stunning audio performance, the Opus makes standalone CD players suddenly seem quaint.

### HIGH DEFINITION

While much of its functionality can be duplicated with a notebook computer and outboard

hard drive – such as archiving CDs, organising and/or manipulating your music library, burning a playlist to CD-R – the Opus 4HD makes home-brew music

servers look clunky and inelegant, like something slapped together by an engineering student.

Its capacity is dazzling: the 1TB version of the Opus 4 can handle 1638 CDs as uncompressed WAV files (1411.2kbits/sec) or 2889 CDs as FLAC files (lossless compression, 800kbits/sec), or 18,059 CDs as ACC or MP3 files. The

'Its capacity is dazzling: the 1TB unit can hold 2889 CDs as FLAC files'



**ABOVE:** The Opus comes pre-loaded with a dozen Chesky Records HD tracks which, along with music ripped from your own discs, are processed by 192kHz/24-bit Burr-Brown PCM1792A DACs

trayless slot grabs a disc only after you've pushed it almost all the way in.

The 'HD' designation stands for 'High Definition', referencing some pre-loaded Chesky high-resolution recordings. Internet connectivity (wireless or Ethernet) lets the Opus download high-res recordings from the Chesky site, search for information regarding CDs loaded to the hard drive, and stream web radio via the Shoutcast portal. Rear-panel connectivity includes

USB, HDMI (for an external monitor), digital coaxial and optical, and unbalanced analogue outputs.

I used coax out, to an April Music DA100 Signature DAC (which couldn't recognise the bit rate of the high-res tracks) and analogue out, using

long runs of Mogami microphone cable to my Halo C2 preamp/processor.

Sound quality of the high-res tracks is astoundingly good – easily better than either my Oppo BDP-83 universal player in SACD mode or my Integra R1/Stello DA100 Signature/Magules Magenta ADE-24 compact disc playback chain. The Opus's playback of ordinary CDs, and of archived

tracks (WAV files) is superb: deep, seductive soundstage with tremendous dynamic shadings, excellent extension at the frequency extremes, and especially well-defined details.

### SIMPLY A BARGAIN

A favourite use is random mode. I like surprises of a sort, knowing that every track is one I like but having no idea about the order of playback. Oddly, 'Hungarian Rhapsody' is always the first track, but there a repeatable pattern stops. With the hard drive only slightly full, there's enough music to last an entire day without a repeat.

Its musicality, ergonomics, and build quality make the Opus 4 the equal or better of most dedicated CD players in its price range (\$2000 for the 1TB model; the standard CD-only version is cheaper).

And in the US at least, the company is offering to load 100 of your chosen CDs onto your Olive 4 for free, ripping them losslessly so that when your unit arrives your music is ready to play. Add in everything else it does so exceedingly well and it's simply a bargain.

Olive VP Robert Altmann says the company's primary markets are the US, Germany, and the UK. See [www.olive.us](http://www.olive.us)



**Jim Lesurf**  
Science journalist

Jim Lesurf has spent a lifetime in audio, both as an engineer at UK hi-fi company Armstrong and reader in Physics and Electronics at St Andrew's University

# Copyrights or copywrongs?

Copyright law exists to ensure that writers and musicians benefit financially from their work. But it extends to audio and technical data too and, says **Jim Lesurf**, it's a law overdue for change

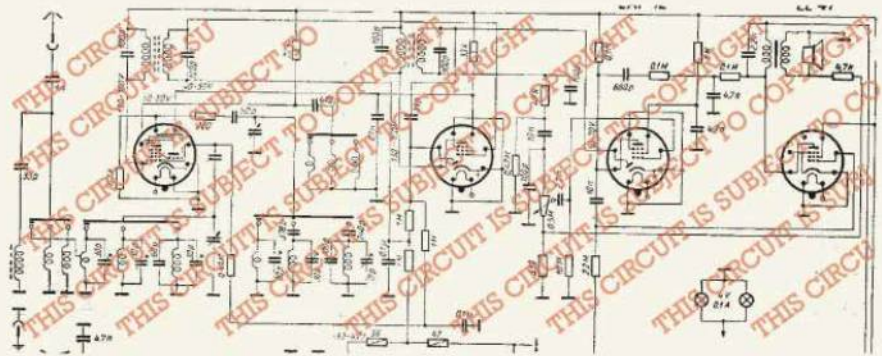
Is copyright a good idea? As a writer I can see it has its good points. The obvious advantage is that it allows you to get income from your work. But it also gives you other important rights. For example, it protects you against others changing your words and presenting ideas you don't agree with as if you'd said them. It also allows you to insist that you should be named as the author. So copyrights aren't just a question of money, but of being able to ensure that people can know who created what.

However, many people now simply ignore copyright. Every day countless MP3 music files are downloaded without permission or payment while on the near horizon are eBooks, iPads and iPlops (or whatever they're called) which look set to put the wind up the print media too. After all, if people can share music files illegally, what's to stop them from doing the same with online versions and scans of magazines and books?

**ORPHAN WORKS**

I like the basic idea of copyright and think it has its uses. But at times it can also be a pest. When I want to find and read old articles or books I often run into the problem of 'orphan works'. These are works whose original publishers have vanished, and where the author (or descendents) also can't be traced. Such publications may contain useful information or material people would enjoy reading. But they exist only as a few hard-to-find battered copies, and no-one can legally republish and distribute them since they can't find the owners of the copyright to obtain their permission.

And the situation is no different when it comes to old circuit diagrams and technical data for audio equipment produced by makers who have long since ceased trading. This can be very annoying. The law prevents people from continuing to access content



**ABOVE:** While copyrighted, some content was clearly meant by its creator to be accessed in future years; present copyright laws can hinder learning and the appreciation of good work

that the original creator clearly wanted people to be able to read. And it can make understanding or maintaining old equipment harder if you can't get a copy of the relevant information. So the present copyright laws can sometimes act as a bar to accessing information. As such they impede learning and the appreciation of good work.

If that wasn't bad enough, it gets worse. Consider the case of a music company which has a back catalogue of thousands of recordings it 'owns'. It may have a number of recordings of a given item – say Beethoven's Symphonies – by various orchestras and conductors. It can then milk its back catalogue by selectively re-releasing items as and when it chooses. Sounds great, doesn't it? Yet there's a snag. To maximise its profits the company decides to push one or two favoured conductors and repeatedly re-releases those particular versions. And to avoid competing with itself it sits on the other recordings and never re-releases them.

As a result, some people find their work becomes unavailable for decades simply to ensure that the company gets to

manipulate consumer choice and have a clearer run at the money. Is that fair on the performers whose work is buried? And what about the fans who are denied the chance to buy recordings they might, on balance, prefer?

**DO YOU COPY?**

Personally, I'd love to see some fundamental changes made to present day UK copyright law to deal with

problems such as these. Firstly, there should be a way to openly republish orphan works after a suitable time delay. Secondly, if a copyright owner or publisher refuses to republish works

in public demand then others should be allowed to do so.

Of course, those who create something deserve to be paid, and to be able to protect their output from being misrepresented or distorted. But we – and they – should also be able to rescue their work from being lost or buried.

So isn't it about time we made some changes to our copyright law to deal with the copywrongs that sometimes accompany copyrights? ☺

'Present copyright law can act as a bar to accessing information'



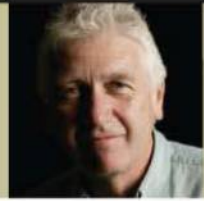
Somehow Coventry didn't seem such a bad place after all



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**Steve Harris**  
Contributing Editor

Steve Harris edited Hi-Fi News between 1986 and 2005. He loves jazz, blues music, vinyl and vintage hi-fi and anything that makes good music come to life

# Adapt and survive

Interest in CD may be waning, but the silver disc is not going without a fight. There are enhanced versions to entice you and now, says **Steve Harris**, its retro credentials are starting to have appeal

**C**ontrary as it seems, no sooner had we started to hear that the little silver discs had become an endangered species, than I began to feel a new affection for them.

Doomed in the world outside, CD has adapted and survived in the audiophile market by growing extra initials whenever it could. As early as 1987 we had Mobile Fidelity's UDCD or Ultradisc, with gold replacing aluminium in the reflective layer. In 1995 came JVC's XRCD, trying to lift the master quality by using 20-bit processing, although the disc itself remained resolutely 16-bit.

By contrast, Pacific Microsonics' HDCD, or High Definition Compatible Digital, promised to give you the equivalent of 20-bits worth of data in a 16-bit signal, as long as you had an HDCD-equipped player.

But HDCD was quickly overshadowed by DVD and the prospect of 24-bit/96kHz audio, not to mention SACD. In 2000 Microsoft bought Pacific Microsonics and added HDCD to its Windows Media Player software, so PC users with a 24-bit soundcard could decode HDCD discs.

## A NEW WAVE

More recently, as mainstream CD sales dropped, came another wave of new enhancements and acronyms. In 2008 Sony launched Blu-Spec CD, a spin-off from Blu-ray, with the pits in the reflective layer recorded by a shorter-wavelength blue laser. JVC and Universal (Japan) added three extra letters to create SHMCD (for Super High Material CD) while Japanese disc manufacturer Memory Tech came up with HQCD (Hi-Quality CD). Both use a more perfectly-transparent polycarbonate material, originally developed for LCD television, while HQCD also uses a silver alloy reflective layer.

Catalogues of both kinds of discs have been growing, but so far they are only



**ABOVE:** The SHMCD and hybrid 20th Anniversary versions of Dire Straits' *Brothers In Arms*; each has its own sound, but is it possible to say which format is inherently superior?

available by ordering from Japan. Recently, rather belatedly perhaps, I finally sat down with a colleague and listened seriously to some SHMCDs.

Steely Dan's *Aja* has been issued in a couple of different SHMCD editions, but the one we listened to was UICY-93520. We compared this with the 1999 remastered CD issue, MCA 811745-2 and the earlier CD release, MCAD-37214. The 1999 CD bettered the older one, with a fuller sound. But the SHMCD was quite a surprise, as it was a lot better still. It sounded smoother, more spacious, with better detailing combined with a more relaxed and listenable quality. Even the bass seemed tighter and more rhythmic. It was just 'better'.

It was hard to believe that such a change was due solely to the disc material. But as so often happens, we didn't know what other differences there might have been in the mastering and manufacturing.

Proving the point, perhaps, a comparison of the Dire Straits' *Brothers In Arms* SHMCD [UICY-81415] against the lovingly-remastered SACD/HDCD *20th Anniversary Edition* [Vertigo 987147] was

nowhere near as clear cut. The SHMCD could sound more revealing of nuances, including the harmonic structure of bass notes. But this time the differences did not seem to add up to 'better' in the same way.

## MORE INVITING

The *20th Anniversary Edition* actually seemed a little warmer and more inviting. Even using a non-HDCD-capable DAC. And even though, with this hybrid disc, the laser was reading the CD data, not just

through the usual polycarbonate, but through the SACD layer as well!

So what, if anything, could we now attribute to the 'SH' material? Hard to

'Doomed in the world outside, CD has adapted in the audiophile market'

say, although I find it hard to dismiss the clear superiority of SHMCD on some titles.

In any case, my more technically-minded colleagues will find such subtleties irrelevant, as they now mainly store and access their music on hard disk. For them, an optical storage medium like CD is simply old-fashioned. But, oh dear. Perhaps that's why I've begun to like it. ☺

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## YOUR VIEWS

# Sound Off!

Correspondents express their own opinions, not those of *Hi-Fi News*. We reserve the right to edit letters for publication. Correspondents using e-mail are asked to give their full postal address (which won't be published). Letters seeking advice will be answered in print on our Sound Off pages, but due to time constraints we regret we're unable to answer questions on buying items of hi-fi or any other hi-fi queries by telephone, post or via e-mail.

## A MATTER OF TIME SPEAKER POLARITY AND MAGNETIC FLUX

**K**eith Howard's review of the Green Mountain Eos speakers [*HFN* April '10] mentioned the importance of time alignment in multiple speaker systems. The 'normal' practice of mounting the tweeter in line with the mounting flanges of the lower frequency drivers adversely affects the transient response because the sound from the tweeter has a shorter distance to travel. This would cause a dip in the frequency response around the crossover frequency if designers didn't compensate by reversing the connections to the tweeter, thus allowing the sound from the two units to arrive in phase. This, however, only works for continuous waves, transients being incorrectly low in power.

Another point which caught my eye was Steve Harris's article 'Magnetic Moments' in which Alex Garner – retired technical director of Tannoy – claims that as ceramic magnets effectively isolate the top and bottom plates of speakers from each other, there is no shorted turn around the voice coil and no control of the motional impedance of the voice coil. Can you please explain how, if the magnets were made of an electrically conducting material like Alnico, this would provide a shorted turn around the voice coil, when the air gap in which the voice coil operates is breaking the electrical circuit?

*Mike Ford, Bromsgrove*

Keith Howard replies: Mike Ford is wrong to suggest that reversed polarity tweeter connection is done only to correct for differences in path length between midrange driver and tweeter. It is done, more usually, because certain crossovers demand it, either to achieve flat frequency response through crossover (eg the second-order Linkwitz-Riley crossover alignment) or to reduce phase distortion (eg third-order Butterworth alignment)

Other types of crossover, such as the fourth-order Linkwitz-Riley, do not require this – both drivers are connected with the same polarity and so the odd result on a step input of one diaphragm moving backwards while the other moves forwards is avoided.

Alex Garner replies: The answer to Mike's second question lies in the Tannoy patented Flux Control Ring and the mechanical centring of the machined pole piece into the LF top plate. The flux control ring is an aluminium ring which controls the separation between the pole piece support flange (with machined pepper pot phase corrector and horn mouth) and the top plate ring. The control ring is electrically conductive aluminium but, as aluminium does not support magnetic flux it plays no part in the main magnetic path other than to provide an air-gap-like flux path bleed across the HF air gap. The single cylindrical Alnico metal magnet drives the two air gaps in series. The thickness of the control ring adjusts the relative magnetic flux in the LF and HF magnetic gaps, giving the designer a degree of control over the relative sensitivities of both the HF and LF output of the Dual Concentric driver.

Looking at the magnet arrangement from a magnetic flux path point of view, the total magnetic flux from the Alnico magnet passes from the north pole of the magnet, through the low frequency top plate, through the low frequency voice coil air gap, through the steel pole piece and on to the high frequency voice coil air gap. Then back through the HF back plate and returns to the south pole of the magnet. Both LF and HF air gaps are shunted (connected together electrically) by aluminium rings. The LF shunt centres the pole piece during the production process and the HF shunt

**RIGHT: Green Mountain EOS with its sliding tweeter**



**ABOVE: Tannoy's venerable Dual Concentric driver with patented Flux Control Ring**

supports the pole piece and apportions out the magnetic flux ratios. Looking at the magnet arrangement from an electrically conducting path point of view there is a complete short circuit across both voice coil air gaps using aluminium shunt mechanisms which is completed by the electrically conducting Alnico magnet.

The control of the motional impedance of the voice coil and the reduction of odd-order harmonic distortions that arise by 'flux control' rings which control eddy currents circulating within the magnet metalwork is a relatively new discovery. Tannoy recognised the effects of voice coil motional impedance artefacts while researching the Inductive Coupled Transducer (ICT) principle, where the HF aluminium diaphragm is itself a shorted turn around the LF voice coil and is driven by induced currents from the voice coil according to electrical transformer theory. The result is a very lightweight HF diaphragm which can take immense amounts of power without distress for high sound level applications. Further research has shown that for simple magnet designs the air gaps do not in fact have

to be electrically shunted to provide impedance control. Because the magnetic flux direction, the current flow direction and the direction of force giving rise to motion in the voice coil are all at right angles to each other it is sufficient to mount aluminium control rings

very close to the voice coil outer diameter, where the fringing leakage flux from the magnetic air gap provides sufficient flux to control the back EMF (Electro Motive Force) arising from voice coil currents on the move in the aluminium shorting ring. But that's another story...



## Sound Off!

## Message in a bottle

WHY TRUE C6A7 VALVES ARE WORTH IT

Robert Harris's article on valves in the April issue was excellent but I would like to flag one point, which is I think important as it has a bearing on sound quality and the presentation of music.

Robert comments that the EL34 (6CA7) is a pentode valve. However, although the C6A7 has the same electrical characteristics as the EL34 pentode, it is a beam tetrode so has a different physical construction. Because they are interchangeable, many producers label their EL34 pentodes as EL34/C6A7, but it is worth seeking out the true C6A7 tetrode valves as they provide a different presentation of the music which can be very beneficial.

The EL34 gives a very smooth and sometimes laidback sound whereas the true C6A7 gives a more robust and upfront sound with, to my ears, a bit more detail. So for

any EL34 user feeling they want a slightly more 'gutsy' sound, it is well worth trying the swap.

Many users will be familiar with the KT88 tetrode which gives a more brightly lit and robust sound than the EL34, but these cannot be swapped without internal adjustments to most amplifiers. So the C6A7 is ideal for bringing that little bit of extra life to your music without the cost of adjustment to an EL34 amplifier.

One manufacturer that produces the C6A7 using the original tetrode 'big bottle' design is Electro-Harmonix. But do check out manufacturers' guidance before you set about swapping valves!

*Andy Crossey, Herefordshire*

**ABOVE: Electro-Harmonix 6CA7 – big bottle beam-tetrode version of the EL34**



## Fireface 800

READER SEEKS PERFORMANCE TIPS

I read Keith Howard's test of the PS Audio PerfectWave DAC [*HFN* Aug '09] where he compared it to his RME Fireface 800 external soundcard. Due to favourable testimonials concerning the Fireface, I bought a sample from a studio. To be honest, the Fireface does not sound as good in my set-up as my Primaire DVD 30 player and I'd like to know how Keith uses his Fireface so that it works at its best.

My set-up sees the Fireface fed from a PC running Windows 7 using JRiver and ASIO Fireface drivers. Digital data is via a simple Firewire 800 PCI card. Analogue outlets are connected to my deHavilland tube preamp which is in turn connected to a CJ Premier 140 tube power amp feeding Focal JM 1007 Be loudspeakers. I also use DAAD sound absorbers and a PS Audio Powerplant as auxiliaries.

*Geir Tjonneland, Norway*

Keith Howard replies: It should be remembered that the Fireface 800 is a very high-value device that provides multichannel A/D conversion as well as multichannel D/A conversion for less than £1000 online. In my experience it does not offer the ultimate in sound quality from a FireWire audio interface: the Weiss Minerva (stereo) or Prism Sound Orpheus (multichannel) – both of which I've reviewed in *HFN* – are superior, but also a lot more costly.

It's certainly worth experimenting with different player software: it shouldn't make a difference but in practice can. I have no experience of Windows 7 yet but with XP my favourite player – for sound quality, not its interface – is Foobar (see [www.foobar2000.org](http://www.foobar2000.org)). As it's free, you might like to try it and experiment with different output options by downloading the appropriate plug-ins.

I don't know if the Fireface 800 is compatible with WASAPI, for instance, but if so give it a go. Whatever you do, remember to obviate the OS performing automatic sampling rate conversion.



**ABOVE: The Fireface 800 from RME – try experimenting with different PC player software**

## Gentlemen, we have lift off...

A TALE OF STATIC, PLASTIC TURNTABLE LIDS AND THE DAYS OF LOW TRACKING FORCES

In the Sound Off pages of the March 2010 issue, a reader bemoans the fact that few of the turntables reviewed in *Hi-Fi News* these days come supplied with the traditional hinged lid to keep records dust-free during playing.

Fortunately, my 35-year-old Thorens does, along with a proper plinth and suspended sub-chassis! However, I always unclip the hinges on the plastic lid and set it aside before playing an LP.

The reason for this arose from a comment in *Hi-Fi News* many years ago, in the era when ultra-low tracking forces were fashionable. A reader complained that when he started the record playing and carefully lowered the plastic lid, the static charge on the latter immediately lifted the pick-up off the record surface!

While such low tracking forces may now be a thing of the past, there nevertheless seems a good chance that

the tracking force may be affected when playing a disc with the lid closed.

While a quick experiment with the pick-up resting on a stylus-balance placed on the platter certainly failed to produce 'lift-off' when the lid was closed, rubbing the lid with a cloth made of polyester did manage to produce an upward twitch of the balance on each pass.

Possibly this is all that can be expected with a well-earthed metal arm tracking at 2.1g, but I shall continue to regard the lid as solely for protecting the deck and keeping it clean when the turntable is not being used to play records!

As for keeping my records clean, I simply attend to each disc with a carbon fibre brush and an anti-static gun after, as well as before, playing it.

Just never allow your fingers to touch and contaminate the bristles on the brush!

*Alan Foster, Amersham*

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AND THERE WAS CHA'AM



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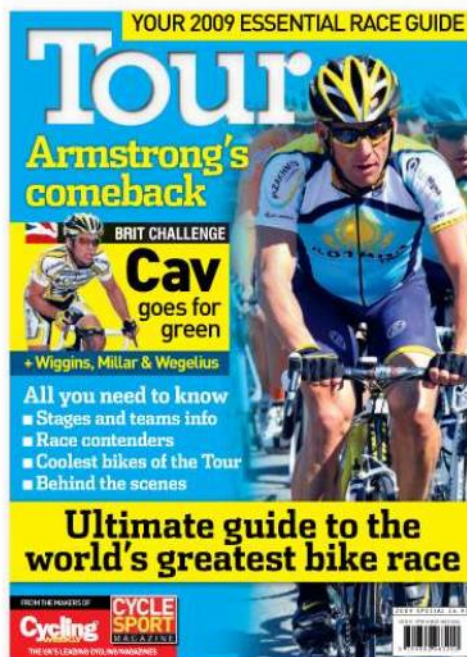
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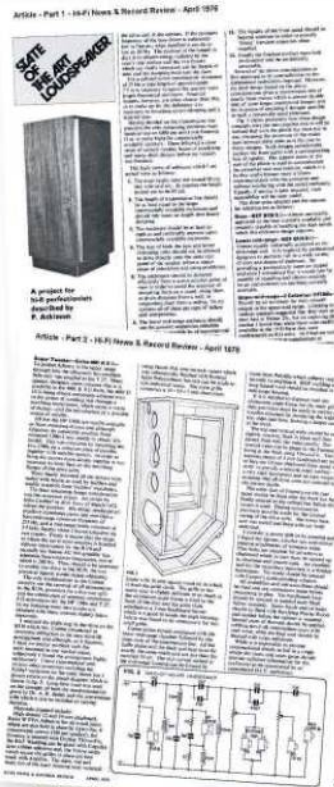
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## DIY speaker '70s style

PEDIGREE DESIGN FOR SURE, BUT IS IT STILL 'STATE OF THE ART'?

I'm considering purchasing secondhand a DIY loudspeaker that was originally constructed from plans featured in your magazine some years ago. The article, written by P Atkinson, described the speaker as being 'State Of The Art' and I am wondering if it is still regarded so when compared to modern designs. As I am interested in transmission-line speakers, this speaker could be a cheaper alternative to models currently made by companies such as PMC.

The drive units used are highly regarded even today, as they are employed in the LS3/5A, among other designs. I enjoy the magazine hugely – it certainly seems like the hobby of hi-fi isn't going away!

*Robert Park, via e-mail*

Keith Howard replies: I have no experience of the 'State Of The Art Loudspeaker' design published in *HFN* April 1976 but I believe you would be ill-advised to buy a pair secondhand, for two reasons. First, loudspeaker design has advanced a long way in the past three decades. Second, drive units deteriorate over long periods, so it is unlikely that the pair of speakers on offer will achieve their original potential. One final point to consider is that most of the drive units used in the design are no longer made and so would be difficult, if not impossible, to replace.

## A hardened fan of omnis

READER FROM DOWN UNDER SHARES CONCRETE SPEAKER RECIPE

I have been a regular reader of your excellent magazine for some ten years and may I say how happy I was to see you drop that layout style of a year or two back. It was a frustrating mish-mash of odd camera angles and hard-to-read colour-on-colour type.

The yellow border has heralded a return to the previous excellence of your publication.

Talking of a mish-mash, that seems to describe my system. It comprises two turntables – a Transcriptor with a Shure V15 Type 3 cartridge alongside a Project Perspective with Micro MC. Model not known. These feed a Cambridge 640P phono stage and are accompanied by a Denon 1940 universal player, Sony BDP-S550 Blu-ray player and MF X-A1 amp.

The speakers are my own design [see right], being an omnidirectional type made of 280mm fibrous cement pipe. I know omnis are not very popular at the moment but I would urge anyone with a small listening room to give them a try as you still get good imaging even when sitting quite close.

The pipe itself measures 980mm in height and is made of fibrous cement, sprayed with stone paint. Eight-inch base/mid drivers sit in the top and the tweeters sit in the top half cone. The reflecting cones are, at the moment, hand carved from dense stiff foam while 19mm aluminium pipes hold the cone up. The bases are MDF and are quite easy to make.

Now, the base loading: the pipe is open baffle, if that is the right term, and the base is open. I have divided it into three chambers. The top one is heavily stuffed with Dacron wool. Then comes a divider. The second chamber is half that amount, with a divider, and the last one is only lightly filled – enough to hold the crossover in place. The dividers are, in fact, egg trays. These are good sonically and get rid of standing waves.

The crossover is a simple 2nd-order device crossing over at 3kHz. Now, if I could just get the toe-in right!

*Martin Bray, Australia*



## RIP SACD

BUT DON'T BLAME IT ON US, KEITH!

I was surprised at Keith Howard's recent claim that the 'music-buying public allowed SACD and DVD-A to wither on the vine' since it was his very criticisms and doubts about the medium that, initially at least, discouraged some of us from investing in it. A few years ago Sony was said to be abandoning the medium and the format war with DVD-A was very off-putting. I have a collection of very fine Pony Canyon classical HDCDs and didn't want another dying format cluttering the shelves. All very ironic as SACD has a rather larger niche than HDCD, and now I feel a little disappointed not to have acquired a player. Still, give this music-lover a break, Keith, it wasn't all my fault!

*Jayne Lee Wilson, Liverpool*

Keith Howard replies: Indeed it wasn't, Jayne. As you suggest, there were many good reasons not to buy into SACD and/or DVD-A, although doubts about sound quality were always – in my case, anyway – directed at SACD, never at DVD-A. I've had no doubts about the merits of higher sampling rates since reviewing one of the double-speed Pioneer DAT players in the early '90s and inviting Tony Faulkner to use it at some of his recording sessions. I do agree, though, that the audio press shares the blame for the failure of DVD-A and SACD – albeit not because we had the temerity to question whether they always delivered on their promises. We did that with CD big time, after all, but the snowball kept rolling.

What I never understood was why there was so much underlying negativity towards the new media from journalists who'd been grumbling about CD, one way and another, for over 15 years. But perhaps that's not so surprising really: not when you see that many of them still view vinyl replay as the only true answer, and that multichannel audio is only for people (sad people, by implication) who enjoy home cinema. Just don't get me started!

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# Jack Dinsdale

An academic with a passion for the accurate reproduction of music, Jack Dinsdale first made waves as co-inventor of the world's first transformerless semiconductor amp. Next was the 'trough', seen today on Townshend turntables. **John Bamford** met him...

It was August 1979. Jack Dinsdale was bustling enthusiastically around the demonstration rooms at the London Audio Fair when the hall began to rotate, his legs went wobbly, and he felt himself passing out. He'd been up since dawn, it was now well into the afternoon, and in the buzz and excitement of it all he'd forgotten to eat.

'As I came to, I found myself sitting in a chair being tended by a kindly stranger with a strong Australian accent,' recalls Jack. 'He was encouraging me to wet my whistle with a can of Foster's lager.' The stranger was Max Townshend of Townshend Audio, who was exhibiting at the show selling his Elite parabolic styli and pickup cartridges.

'As we introduced ourselves, Max enquired of me, "You're not the Jack Dinsdale who invented the transformerless semiconductor amplifier, are you?" It transpired that two decades earlier I'd unwittingly almost ruined the young Townshend's education prospects. You see, as a student back in Oz he'd been supplementing his meagre allowance with a part-time job winding transformers for amplifiers,' Jack chuckles. 'We eventually parted with me thanking Max profusely for having rescued me from the floor and promises to keep in touch...'

## ACADEMIA MEETS AUDIO

An audio enthusiast since childhood, Professor Jack Dinsdale was visiting the London Audio Fair from Bedfordshire where he was a senior lecturer at the Cranfield Institute

of Technology (now Cranfield University). It was in 1961, while working in the guided weapons division of Elliott Brothers (later to become part of GEC-Marconi) that he and colleague Richard 'Dick' Tobey – a fellow hi-fi enthusiast – had their revolutionary circuit designs for a transistor amplifier that required no output transformer published in *Wireless World*.

'After graduating from Trinity College Cambridge in 1959 with a degree in mechanical sciences I joined Elliott Brothers at

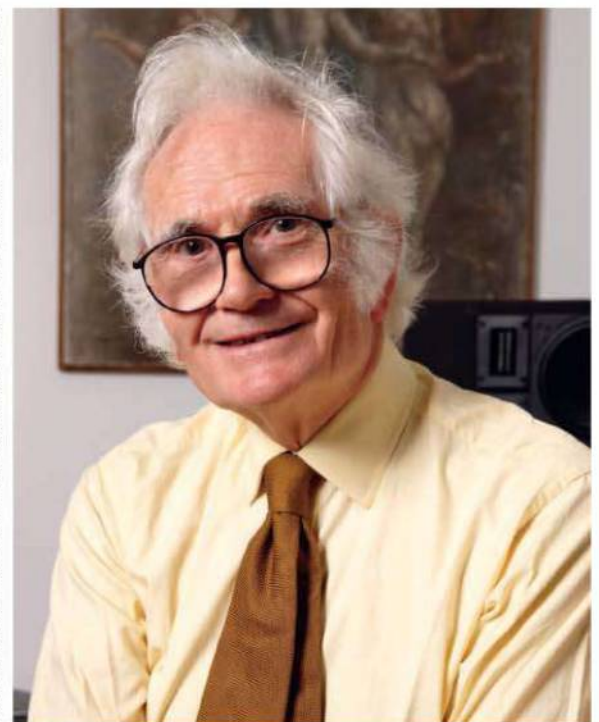
Borehamwood developing circuitry for inertial navigation systems using discrete germanium transistors –

this was pre-silicon and pre-ICs – and spent several years on the development of computers and their applications, eventually becoming involved in the design of complex defence systems.'

As Jack recounted in correspondence published extensively in *HFN* in October 1996:

'We were searching one day for a 10W wideband power amplifier circuit when we came across an article by RCA's Dr Hung Chang Lin in *Electronics* which described the now well-known 'quasi-complementary'

'The Tobey-Dinsdale circuits created a stir across the globe'



**ABOVE:** Content in retirement, Jack Dinsdale still enjoys visiting the dem rooms at UK hi-fi shows

**BELOW:** From Jack's collection, an early Tobey-Dinsdale transistor amp built half a century ago

output configuration. Since germanium NPN power transistors were unobtainable, Dick Tobey and I took Lin's basic idea and developed a practical circuit using two PNP output transistors with complementary drivers.'

## PRICE OF CELEBRITY

The Tobey-Dinsdale amplifier circuit designs described in the November and December 1961 editions of *Wireless World* created a stir across the globe and caused Jack and Dick to become instant celebrities in audio circles.

'We negotiated with Sylvania Thorn to make available to hobbyists a cheap NPN transistor, the SYL1750, equivalent to the military-spec 2N388A we had used in our prototype which was, after





**LEFT:** The Cranfield Rock from 1982 – still a prized possession among audiophiles today

all, strictly for a defence application. Years later, I learned that Thorn sold 484,000 of these transistors, either in ones and twos to hobbyists or in larger quantities to companies for making up into amplifier kits.'

Jack also has vivid memories of he and Dick Tobey being invited to demonstrate their prototype transistor amplifier to Harold J Leak and his staff at Leak's factory in south London. The young Jack Dinsdale was taken aback when Leak launched its Stereo 30 transistor amp, based on the Tobey-Dinsdale circuit, at a subsequent audio fair.

'When I complained to Harold Leak that he was using our design without acknowledgement he looked me straight in the eye and said "I have far more money than you, and if you rock my boat I will destroy you". I was totally devastated by this outburst. Dick and I decided that there was probably little we could do without spending quite a lot of time and money, and risking much more, so sadly we dropped the matter.'

### DESIGNS ARE UPDATED

*Wireless World* published updated circuits in January and February 1965 including working drawings (prepared by Jack) showing printed circuits, metal cases and wiring details. Says Jack: 'I was

**ABOVE RIGHT:** With its plinth and platter formed of Granitan, a synthetic stone material, this 1980 prototype 'Rock' turntable with Excalibur arm graced the cover of hi-fi magazines around the world

**BELOW RIGHT:** Harold Leak advertises his company's Stereo 30 integrated amp which, says Jack Dinsdale, was based on the Tobey-Dinsdale circuit

**BELOW:** Still in working order, this historic Tobey-Dinsdale amplifier spawned a myriad transistor amp models, both manufactured and in kit form



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disappointed when amplifiers based on the design were marketed (also without acknowledgement) by some other companies of the era, but heartened when the US company Daystrom – famous for its 'Heathkits' – paid me to check and approve their professional kit based on my circuit.'

As the amplifier was originally designed for the defence industry, it performed as well for the military as for the hi-fi community. During the 1960s it was used to control experiments with the vertical take-off and landing engine that resulted in the Harrier jump-jet aircraft.

### THE CRANFIELD ROCK

'In 1967 I was invited by Cranfield to help set up the first "campus company" – which became CUPE, the Cranfield Unit for Precision Engineering. I became responsible for all aspects of electronics, control and instrumentation applied to the unit's commercial project work. This included developing the concepts of the electronic gearbox and its applications in all manner of production machinery. This was my most prolific period of invention and 14 of my 18 patents were filed during my eight years with CUPE. By the time I left Cranfield in 1989 my patents had generated net royalty income of over £6million.

'In 1975 I contracted acute viral meningitis, which led to encephalitis and an enforced 12 weeks' sick leave. When I returned to work at Cranfield I agreed to move into the academic side, to start a new department based on the work of CUPE. This became known as the Department for the Design of Machine Systems (DDMS).

'All graduate students had to carry out a six-month full-time project on which to write their Master's thesis. As course leader I had access to a succession of student brains which were applied to developing some revolutionary turntable ideas. I felt that turntables and arms had not developed to the same extent as had pick-ups, amps

and speakers. Furthermore a critical examination of contemporary record decks from a strictly analytical viewpoint – Newton's laws of motion, kinematics, lines of action/reaction of forces, etc – indicated that they broke many of the rules by which I was then successfully designing precision machine tools and instruments.

'Ironically my first work on turntable design was a hydrodynamic non-contacting bearing, which has never been exploited to this day. CUPE's management sold the bearing patent to Garrard for a single down payment and a small royalty for each piece sold. Garrard's fortunes soon changed for the worse and it was acquired by Plessey who then sold it to Gradiente, famous for its low-cost turntables, but not known to be interested in specialist hi-fi. Garrard/Plessey/Gradiente never marketed a single deck containing the fluid bearing, yet steadfastly refused to grant anyone a licence for its use, or even to sell it back to Cranfield.

'The second development that I earmarked for a new record player was a synthetic granite material invented by Dr H J Renker, technical director of the Swiss precision machine tool company Fritz Studer AG. It was further developed by CUPE who acquired both British and American exploitation rights and set

**LEAK**



**STEREO 30**  
TRANSISTOR INTEGRATED AMPLIFIER

1937

Jack Dinsdale is born on Christmas Day. Father is an eminent engineer who assists Churchill's War Office during WWII

1950s

Thanks to a radio ham neighbour, develops a passion for electronics

1959

Graduates from Trinity College, Cambridge and joins Elliott Automation (later part of GEC-Marconi)

1961

Having designed the world's first transformerless transistor amplifier with colleague Dick Tobey, the circuit is published in *Wireless World*

1968

Pioneers a university 'campus company': the Cranfield Unit for Precision Engineering (CUPE)

1975

Transfers to the academic side of Cranfield and works on developing the 'perfect LP transcription device'. Patents the Rock turntable's front-end damping trough

1989

Appointed NCR Industrial Professor of Mechatronics at Dundee University. Travels the world as secretary-general of the European Mechatronics Co-ordination Group until retiring in '99



**ABOVE:** Jack and Max Townshend with Rocks, some 20 years ago. Clockwise from top left: Avalon (1988), Mk II Elite Rock (1984), Mk III Rock (1994), Cranfield's 1980 prototype, Rock Reference (1989), early prototype (1977), Cranfield Rock (1982)

up a company to manufacture and market the material under the trade name Granitan S100. It occurred to me that with its reasonable strength and stiffness, coupled with an exceptionally high damping factor, Granitan should be an ideal material for the base plinth and platter of a high performance turntable.

### ARC DE TRIUMPH

'During the 1977-78 academic year two graduate students, Michael Pezet and John Hardwick worked on various aspects of the deck. Hardwick tackled the problem of arm resonance, jointly supervised by my colleague Dr David Parkins and myself. Parkins was all for providing classical "dash pot-and-piston" damping to the arm, but according to accepted thinking this could only be applied at the arm pivot where it hardly solved the problem. "Could you suspend a dash pot over the turntable, just in front of the pick-up," he asked me one day, "and move it along as it tracks the record?" "No," I replied, "but you could cantilever an arc-shaped dash pot - like a trough - over the record and fix the piston just in front of the

cartridge!" The curved damping trough, characteristic of the Rock, had been invented.'

Hardwick developed the idea further for his Master's project and a patent application was filed, with Hardwick, Parkins and myself as inventors. The following year another graduate student, Michael Clayforth-Carr, undertook further work on the deck for his Master's project. It was around this time, not long after having met Max Townshend at the London Audio Fair, when I invited Max to visit Cranfield. Michael was testing a prototype deck in the laboratory. He played part of a record without the damper and the sound, fed through hastily assembled amplifier and loudspeakers, was unremarkable. Then he repeated the test with the front-end oil-filled damping trough in position and Max's jaw dropped to the ground. "How much would it cost to sponsor this design project?" he enquired, waving a rather large

cheque under my nose. The design project now had a sponsor...'

As the 1979-80 session at Cranfield started, John Bugge - an amazing student who had just obtained a first class honours degree from the Open University - finalised the Cranfield Rock design with Excalibur arm for his Master's project and subsequently set up a company, with Cranfield's approval, to manufacture the first commercial Rock player for Max's Elite Gramophones company to market.

'Meanwhile, Bugge's superb-sounding prototype was being used by Max and I at conferences and audio shows to drum up interest for the new deck and to accustom both the public and the technical press to the novel idea of front-end damping.

'Unfortunately it took 18 months longer than scheduled to bring the first Rock to market. Some corners were cut, which should not have been, and although the deck won a prize for design and engineering at the prestigious Chicago audio convention in April 1983, sales failed to meet the minimum number for economic survival and Bugge's manufacturing company was wound up later that year.'

### TOWNSHEND CARRIES ON...

Of course, the basic Rock concept was subsequently developed by Townshend's own company through a series of commercial versions and lives on almost three decades later in the shape of the current Rock V, Rock 7 and most recent Rock 7E designs [see *HFN* April '10].

As Jack Dinsdale wrote in the American high-end audio journal *Positive Feedback* in the early 1990s:

'Musicians cannot live for ever, but their artistry survives through their recordings. For me it has been a happy duty to play a small part in designing the means of enabling their performances to live on, as faithfully to the original recording as science and engineering will permit, long after the performers have passed away.' ☺

**RIGHT:** Today's Rock 7E still proves the efficacy of Dinsdale's damping trough





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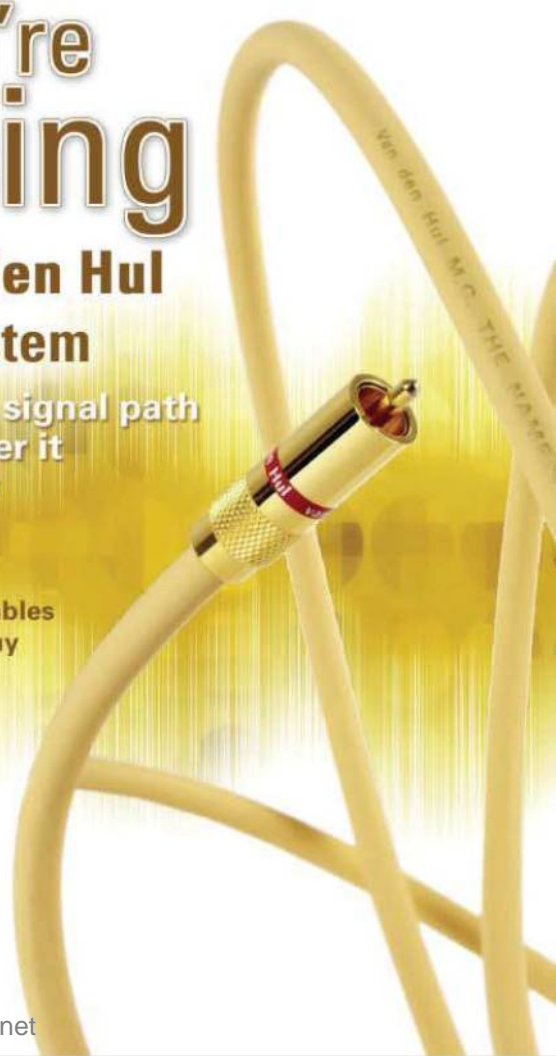
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# Armstrong 222 integrated amp

With its 200 Series of components, Armstrong aimed to offer high performance at a highly competitive price. We find out how the 222 integrated amp measures up today  
 Review: **Jim Lesurf & Haden Boardman** Lab: **Paul Miller**

These days few people will remember names like Ted Rule, George Tillet or Ron Sheppard as being talented designers of domestic audio and radio equipment. And although George also wrote articles for *Hi-Fi News* I wonder if his name would spring to mind as a designer of electronics. Chances are that if anyone recognises George's name these days it will be because he emigrated to the USA and edited a well known audio magazine there!

Arthur Radford and Harold Leak are much better known because their names were on the components they designed and sold. And because they made a point of promoting the technical features of their products. Yet over the years Ted and Ron developed many designs that went into successful production, and probably sold more of them as well. However, what they designed was sold with 'Armstrong' on the front, not the designer's name.

## THE 200 RANGE

For many decades Armstrong concentrated on a mix of what these days we'd think of as 'radio' and 'radiogram' chassis, with superior performance. But around 1960 the company started branching out into

what we'd recognise as hi-fi. Its first major set of units was the 200 range, of which the 222 featured here was a part. This series came onto the scene in 1963-4.

While the aim was high performance, Armstrong's approach was to provide user-friendly domestic equipment at competitive prices. So although you could buy most of the 200 range units in 'bare chassis' form, you could also purchase them in stylish cases that were intended to look good. So they had two 'Spouse Acceptance Factors' – low price and a compact, attractive appearance.

They also were based on an Armstrong habit of offering some technical novelties and features, but without making too much fuss about it. In much the same way as Ted Rule tended to stay in the background, so many technical points were left for the user to discover.

As with its later ranges, the designs were modular in the sense that the same basic design for various sections was used as appropriate in other components in the range. This allowed the units to be sold

at a lower price, and gave the flexibility to let buyers choose what they preferred. The box-out [below left] shows the units available at the time and their model numbers while the prices are the nominal list prices when the units were first put on sale. The prices shown are for the bare chassis models. A case cost an extra two or three pounds, depending on the model.

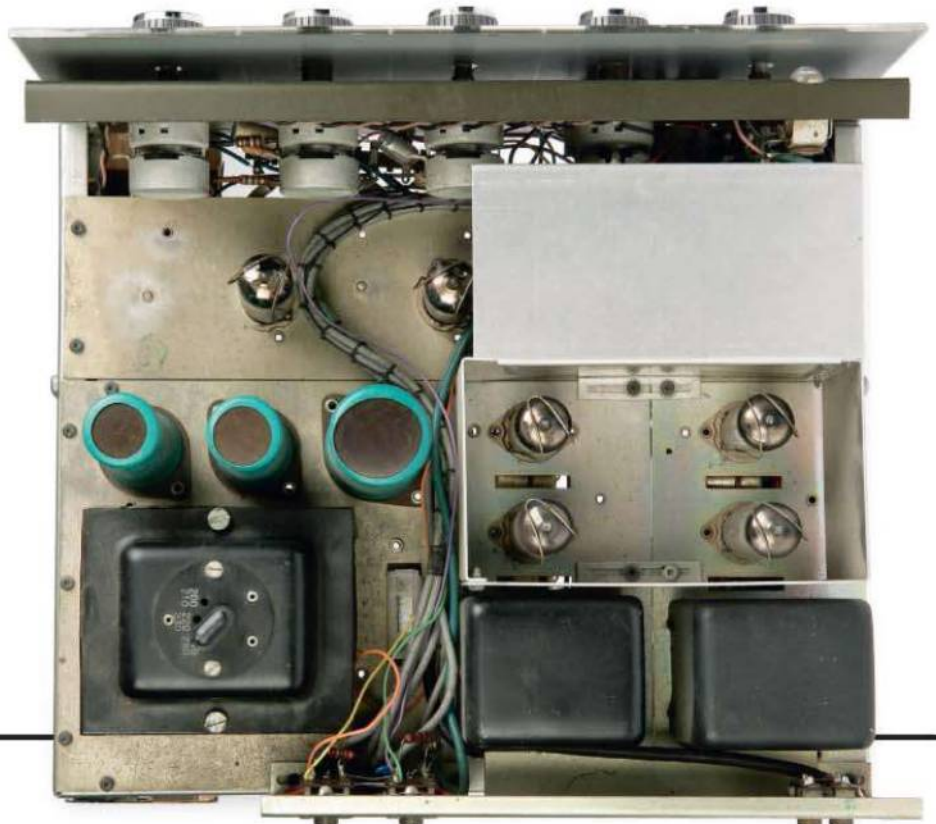
As a comparison, a pair of Quad II power amps and a 22 preamp would have cost you around £65 at the time, while a Leak Stereo 20 plus Varislope preamp would set you back around £55. Hence Armstrong was clearly aiming its designs at what we'd now call the 'affordable' sector.

This was why they also included the '100' series units. These were made as 'budget' models, designed to have the lowest possible price. It's perhaps ironic that the 127 was seen as an inferior product at the time as it used just one output valve per channel, yet nowadays this would make it a desirable cult object in the eyes of some devotees of 'Single Ended' valve power amp designs.

## ARMSTRONG 200 SERIES

200	Power Amplifier (re-styled A20)	£24 18s
221	Integrated Stereo Amplifier (222 with extras)	£33 15s
222	The standard integrated stereo amp	£27 10s
223	VHF/MW tuner	£28 15s
224	VHF tuner	£22 10s
225	Stereo Control Unit (preamp) for the 200	£22 12s
226	Receiver (tuner-amp combining VHF/MW and the 221 amplifier)	£61
227	Receiver (tuner-amp combining VHF/MW and the 222 amplifier)	£52 15s

**RIGHT:** An original 222 showing ECC83s in the preamp stage and pairs of push-pull ECL86s driving the output via two transformers







If the user just wanted a basic integrated stereo amplifier they could choose the 222. This was rated by Armstrong at 10W per channel and it provided the usual set of features for the time: input selector, volume, balance, and tone controls as well as a rumble filter. The inputs had a sensitivity of 80mV into 2Mohm, and there was a tape output providing 600mV. The power amp had around 15dB of feedback. The circuit used four ECL86s for the power amp and two ECC83s for the preamp.

### CRYSTAL PICK-UP

Technically the 222 differed from the 221 in a way that may well appear odd these days. The 222 lacked an input for a magnetic cartridge. It only provided for a 'ceramic' or 'crystal' pick-up for playing records. This was because at the time such cartridges were quite common and some – like the Decca Deram – were well regarded. The 221 was essentially a 222 with an added (transistorised) preamp for

magnetic cartridges. It also provided a tape monitor input which the 222 lacked.

Because mono was also common at the time the amplifiers also offered a feature that can catch out the unwary these days. The input phono sockets had internal switches operated by the insertion of a phono plug into one channel. This meant that if you had a mono source with just one lead, plugging it into the correct socket automatically connected it to both channels of the amplifier to give double mono. But when you plugged leads into both phono sockets the internal switch disconnected the link and you got stereo.

This kind of feature was typical of Ted Rule's designs. In a similar way the AM tuners in the range had an IF bandwidth that automatically widened as the radio reception became stronger. In those far-off days there were fewer AM stations

**ABOVE:** The input selector sits alongside volume, balance and bass/treble tone controls  
**BELOW:** Model 222 circuit schematic

than now, and many of them transmitted a wider audio bandwidth than would be allowed today. Hence with the 200 range tuners you could get a better result from a strong AM signal than is possible now. But with weak signals the tuner automatically narrowed the bandwidth to reduce background noise and interference.

The FM sections of the tuners had a socket, waiting for the arrival of stereo radio. Again, this can confuse some users these days as an absent stereo decoder leaves an open socket, which looks like a valve is missing.

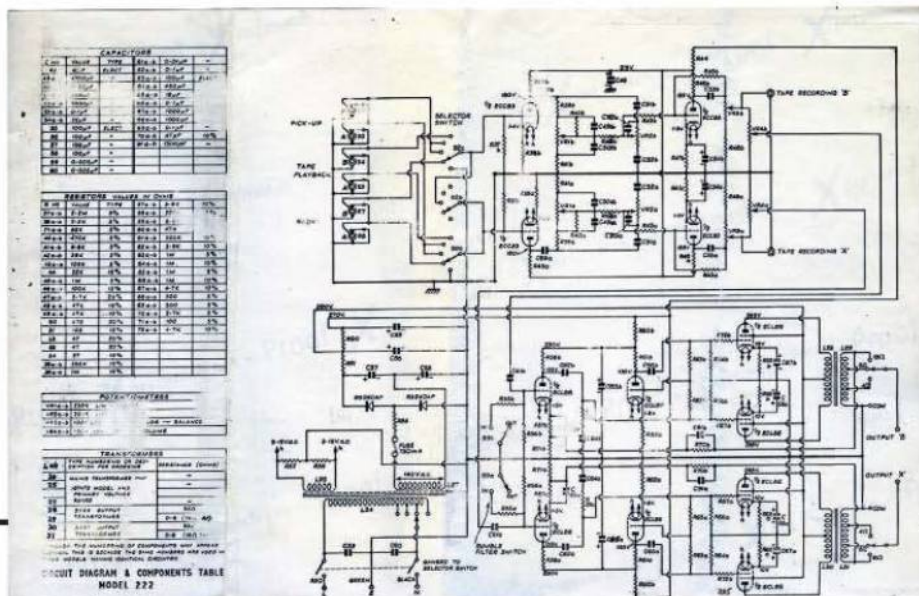
Eventually the 200 range was replaced by the 400 series, which was Armstrong's first all-transistor range. But even then the 127 and 127M models remained on sale for a while to cater for those with a lower budget.

*'The Armstrong excels when it comes to the mid and treble'*

### SLIGHTLY BAFFLED...

A few years ago I was talking to Ted Rule. He retired a long while ago and spends more time pursuing his interest in amateur radio than audio. He was amused and slightly baffled that many people still have a liking for the 200 range and the A20. He thought his later transistor designs like the 600 range were much better. But he was also pleased that people still enjoy using the units he designed so long ago.

If you want to know more about the Armstrong units and see circuits and other technical details in greater depth, navigate to [www.audiomisc.co.uk/Armstrong/](http://www.audiomisc.co.uk/Armstrong/)



## ARMSTRONG 222 (Vintage)

Unlike some recent examples from our Vintage Review series, this Armstrong is not a re-build or a 'tickled-up' version using new old-stock valves. In fact, this 222 is the real McCoy complete with its original Mullard ECL86 tubes, TCC electrolytics and encapsulated output transformers with 4, 8 and 16ohm taps. The left channel was the cleanest on this old boy, achieving the original rated specification of 10W into both 8 and 4ohm (via 8 and 4ohm taps) at up to 1% distortion. Distortion rises swiftly at higher power, the 222 delivering just 1W into 8/4ohm for 2% THD [see Graph 1, below]. In practice, it offers almost exactly the same output as the Pye HF10 featured in our April '10 issue although the 222's push-pull ECL86s contribute to a far higher 40.3dB overall gain than the single EL34 pentode used by Pye.

Like our Pye HF10, however, the 222's flattest response (-5dB/10Hz to +1.8dB at 20kHz and -4.1dB at 20kHz) was achieved with both bass and treble controls set midway between '0' and '1'. Distortion is low at high frequencies, just 2%/20kHz and 3%/40kHz at 1W/8ohm, but increases at LF to 3% at 1W and 19% at 5W/8ohm at 20Hz. Damping is respectable through the bass thanks to the 0.78ohm output impedance but this rises to 4ohm at 20kHz, modifying the system response according to the speaker load. Noise is low with an 83.5dB A-wtd S/N ratio (re. 0dBW). Readers are invited to view a comprehensive QC Suite test report for this Armstrong 222 amplifier by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Inputs for ceramic/crystal pick-ups (phono), tape (in/out) and radio are offered while three transformer taps are provided for 4, 8 and 16ohm speaker loads

[armstrong.html](http://armstrong.html) and <http://jcgj.orpheusweb.co.uk/AudioDocs.html>.

### HADEN BOARDMAN LISTENS TO THE 222...

Given the diminutive stature of this little amplifier, you may not expect much. However, it is clear the little Armstrong is blessed with quite a reasonable set of output transformers. Sure it's no power house – a 10W rating needs careful matching to appropriate speakers – but good results were obtained using a set of 'budget' Monitor Audio Bronze 2, as well as some more efficient vintage stuff.

Bass wise, we're talking more soufflé than heavy pudding; light on dynamics perhaps, but very quick on its feet. What is exceptional here, is the mid and treble, the Armstrong sounding incredibly sweet, open and agile. A lot of small

vintage amps can be quite grungy by modern standards, the use of the classic ECL86 valve in AB1 push pull operation clearly paying dividends with this design.

Alison Balsom's re-working of 'Rondo Alla Turca' [EMI Classics 353 2552] is a prime example of a strong recording that helps display the breadth and power of this little amp's midrange capabilities. Certainly not a strident recording, it can, however, sound flat and hard with the wrong equipment.

Rossini's *L'italiana In Algeri* – [1987: Claudio Abbado conducting the Vienna Philharmonic with Agnes Baltsa and in my opinion one of the best DG recordings] – displayed the amplifier's superb vocal balance and stereo imagery. Meanwhile, classic Rickie Lee Jones sounded full, warm and engaging, her vocals, again, being superbly displayed with proper levels of emotion being communicated to the listener. ☺

### Service Chart

**ARMSTRONG 221, 222**

**Model is available in cabinet or chassis form.**

**In the case of pickup 1 (221 only), when a mono cartridge is used, in addition to connecting this to channel A, a plug with an connection to it must be plugged into channel B input. With model 222 a mono cartridge must be connected to both A and B tape playback inputs to achieve an output from both amplifiers.**

**Pickup input P1. Designed for any mono or stereo cartridge. Overload factor is such that pickups with greater than 100V output will not cause distortion due to overloading.**

**Pickup input P2. Designed for low-output magnetic pickups.**

**Two playback inputs. Intended for playback from cassette recorder or tape deck with associated tape prescaler. Will accommodate output from practically all recordings.**

**Tape monitor input (221 only). For use with tape monitor button is depressed. Monitoring signal from the tape while being recorded to be heard through amplifier and speakers in the normal way. When tape monitor button is depressed, the signal is removed from the monitor and is replaced by a signal from the recorder reproduction from the tape after recording.**

**Radio input. Suitable for any radio tuner. When output should be fed into channel A input. Two radio inputs are provided to accommodate stereo frequency.**

**Input switching. Input sockets automatically switch to their correct function when plug is inserted. Accordingly a mono input will plug into all channel sockets, will alternate to both outputs.**

**Speaker phoning. When speaker terminals are switched, positive and negative, the negative terminals should be connected to the larger pin of the speaker plug. When not phoned, but are identical speakers, connect the left-hand terminal in each case to the larger pin of the speaker plug. Unbalanced and dissimilar speakers must be phoned correctly by inserting into the best performance.**

**Input connections. These connections must be made to both A and B inputs. Mono connections are made to channel A input only. Stereophonic input, particularly when long leads are involved, should be used for all inputs.**

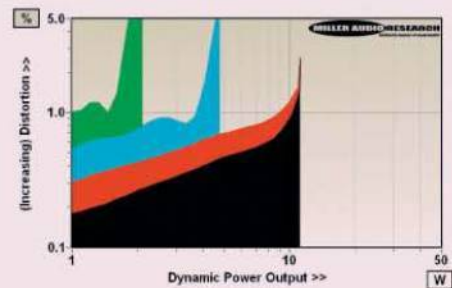
**Input switching. Input sockets automatically switch to their correct function when plug is inserted. Accordingly a mono input will plug into all channel sockets, will alternate to both outputs.**

**ABOVE:** Original 221/222 service chart

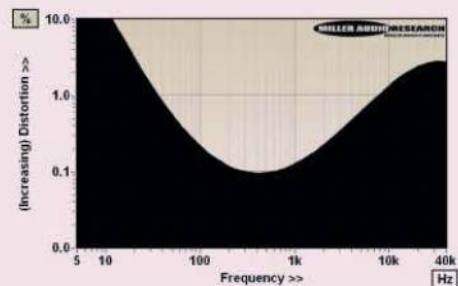
## HI-FI NEWS VERDICT

What marks this little amplifier out is its very honest and open character. It is incredibly light on its feet and quite happy with a wide range of different types of music. True, it's no power house – prog and heavy rock fans will want to look elsewhere for sure – but on vocals, this amp is simply quite stunning. Of course, careful speaker matching is a must if you are to hear the Armstrong 222 at its very best.

Sound Quality: 80%



**ABOVE:** Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads



**ABOVE:** Distortion vs. extended frequency from 5Hz to 40kHz at 1W/8ohm. Distortion rises progressively below 1kHz, reaching 3% at 20Hz and 60% at 5Hz

## HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	10W / 10W
Dynamic power (<2% THD, 8/4/2/1ohm)	11W / 11W / 5W / 2W
Output impedance (20Hz-20kHz)	0.78-4.10ohm
Frequency response (20Hz-20kHz)	+1.8dB to -4.1dB
Input sensitivity (for 0dBW/10W)	27mV / 96mV
A-wtd S/N ratio (re. 0dBW/10W)	83.5dB / 93.5dB
Distortion (20Hz-20kHz, 1W)	0.095-3.1%
Power consumption (Idle/Rated o/p)	75W / 90W
Dimensions (WHD)	315x140x290mm (inc knobs)

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# Robert Kōda

## 匠

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# ARC SP-6



It was the model that established Audio Research as a maker of sublime valve preamps. Yet the SP-6 owed its success almost as much to transistors as it did to the modified Dynaco and ARC tube designs that preceded it. **Ken Kessler** explains...

In 2035 or so, whoever inherits this series will be writing about the Audio Research Reference 5 Preamplifier as a milestone from the Noughties. Of this, I am sure: the Reference 5 is enjoying the same buzz that accompanied the company's SP-6 when it was released back in the late 1970s. That's because both the SP-6 and the Ref 5 tick all the right boxes that merit milestone status.

For the Ref 5, it's simply a case of the preamplifier delivering transcendent performance which has dazzled so many industry

*savants* that you cannot ignore it. At CES in January, AudioQuest's Joe Harley exhorted me to buy one. In all the time I've known Joe, he's never been that smitten by any

product. Ditto for Dave Wilson, who, in his understated way, gave it a nod of approval that bordered on the devout. Back in the UK, close friend and chronic audio casualty Hamish McAlpine said much the same – and his first ARC preamp was an SP-10.

This reaction, in an era rife with so many stellar products that you have to work

at buying a turkey, reminded me of the single model that established Audio Research as a maker of sublime preamps three decades ago.

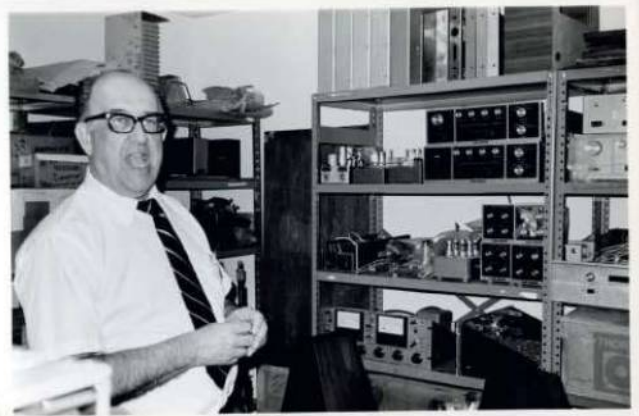
Of course, like every product which has evolved over the years, there are cults for specific incarnations: try getting Porsche 911 or Leica M-series enthusiasts to agree on which version is the all-time best. But even though I know this honour will elicit venom from SP-10 and SP-11 devotees, I kept coming back

to the SP-6.

## TOP RANK

By the time the SP-6 arrived, in 1978, Audio Research had already earned a place at the front

rank of high-end manufacturers – remarkable when you consider that the company was only eight years old. Founder William Z Johnson's company made a rapid transition from modifier of Dynaco units into a distinctive brand with its own circuits and its own look; the earliest



**ABOVE:** Audio Research founder William Z Johnson who brought out the SP-6 after a 'short fight with solid-state'

**BELOW RIGHT:** Carrying on the tradition – the Ref 5 from 2010

**BELOW:** The SP-6 preamp from 1978 – 'a new tube design with its roots in the classics'

preamps actually shared faceplates and chassis with Dynacos.

In July 1972, the SP-3 preamp appeared; with 20/20 hindsight, we might acknowledge it, too, as a milestone, for it represents the midway point between the hot-rodged Dynaco PAS preamps that Johnson first used as the basis for his designs, and the full-blown, 'pure' Audio Research components that launched the look we know today.

Externally, ARC's initial departure from the PAS included a fresh fascia, with a revised layout, but an adherence to the functions of the previous era: it featured bass, treble and 'contour' controls, all of which would vanish with the more purist approach of the SP-6. To put both the SP-3 and the SP-6 into context, the former was born in the era before the modern 'high-end' dominated the upper sector, while the latter was born after the emergence of landmark forces like Mark Levinson electronics and the emergent 'underground' press.

But the SP-3 wasn't all 'vintage': curious niceties like front panel on/off switching for the host of AC outlets on the back would probably

*'The SP-6 ticks all the right boxes that merit milestone status'*





**ABOVE:** The SP-3 from 1972 – the mid-point between the Dynaco preamps used by Audio Research as a basis for its first designs and the ‘pure’ ARC amps of today

not pass muster for CE approval, but back in the early 1970s, it was a handy way of controlling mains power to your cassette deck, open-reel, FM tuner and other sources.

Neither were the tone controls a hindrance for owners who held on to their SP-3s after such functions fell foul of the purists: they could be defeated. Also desirable was the SP-3’s McIntosh-like selector offering mono, stereo, left-only, right-only and reverse – handy when setting up systems but rare nowadays.

#### SIX-YEAR RUN

Nearly 40 years on, though, you can see traces of the SP-3 even in the Ref 5: the rear panel clearly separates the left and right channel connectors into two horizontal rows, though the circa-2010 unit now houses balanced XLRs in addition to phonos, and the AC outlets have vanished.

Inside, the SP-3 was an all-valve design with the power supply PCB separate from the preamp PCB, with

tidy hard-wiring and the cables all neatly gathered. Again, it looks like an antediluvian progenitor of the Reference 5, with similar techniques still in use today.

During its six-year run, the SP-3 also established another ARC tradition that would take years to break, and which defined the lifespan of the SP-6. It was the impulse to refine and upgrade

the unit on an ongoing basis, to such a degree that the changes warranted new model designations.

Unlike most manufacturers

who simply would not bother to announce that they’d changed the value of a capacitor here, a resistor there, Audio Research felt obliged to celebrate it. ARC acted like Linn, which did the same with the LP-12 by portraying upgrades as both a virtue and an event. And while it extended the life of the product, it created resentment in some quarters. But more of that anon. ☺

*‘It went through the most revisions of any ARC preamp’*



#### CHARTING THE CHANGES

While SP-6s are plentiful, ‘which to buy’ creates a dilemma more baffling than assessing condition or price. The SP-6B was a sweet and musical 12AX7-based preamp. The SP-6C, with the change to the 6DJ8, was more dynamic with better bass and impact. In typical audiophile fashion, there simply is no consensus as to which is ‘the best’, but for what it’s worth, my money would be on the SP-6B.

The known variants include:

- SP-6 (1978) Two 12AX7 LN, four 12AX7. Regulated high voltage (HV) supplies, unregulated low voltage (LV) supplies
- SP-6A (1978) Six ECC83/12AX7. Added LV regulator for some tubes. SP-6 and 6A did not have an auto mute circuit, so one *must* manually mute them before powering-up or down
- SP-6B (1980) Six ECC83/12AX7. Major redesign. Added auto and low-line muting, DC offset sensing, more sophisticated power supply regulation stages
- SP-6C (1981) Two 6DJ8 and four ECC83 or equivalents. Changed to 6DJ8 in V3 and V6, HV power supply simplified
- SP-6C-1 Revised HV power supply again, muting circuit simplified, bias trimpots eliminated
- SP-6E (1982) Audio circuit modified, power supply revised.
- SP-6F SP-8 circuit board in SP-6 chassis. Two 12AX7 LN, three 12AX7, two 6922, one 12BH7.

According to the peerless Audio Research Database [see box-out, p118] and gleefully confirmed by Dave Gordon, Audio Research’s Managing Director of Sales, the SP-6F is actually an SP-8 MK II. Back in the day American Sound in Toronto could not get any SP-8s to meet customer demand due to a lack of SP-8 faceplates at the time. Some creative thinking between ARC and American Sound led to a run of 20 (or so) SP-8 MK II’s with SP-6 faceplates. They called it an SP-6F.’

Dave adds that, ‘the original retail price of the SP-6 was \$1095, when launched in May of 1978. The SP-6A was \$1195; the SP-6B was launched at \$1295, later increased to \$1,495 and ending up at \$1795 when production ceased, and the SP-6C was \$2195. The rare, final model, the SP-6E, sold for \$2350. Total sales of all SP-6s was 3500, with the SP-6B being the most popular model.’

In 2010 prices, an average of all the SP-6s would have been equivalent to £5200, less than half the price of a Reference 5. A quick search online suggests that one might find a decent example for as little as US \$500-\$1000, and that it will sound – by today’s standards – wonderful, if a bit cloudy in comparison to current units, and modern tastes. But that’s not to say it can’t be made to sound modern...

# AUDIO MILESTONES

Although the high-end community was much smaller 35 years ago, it was a noisy, hyperactive cult with its own jungle drum: the nascent underground press. They loved the SP-3, which earned the accolade of *The Absolute Sound's* Editor's Choice as 'State of the Art' in 1975. The SP-3 stayed newsworthy for a half-decade-plus because of the updates from the original SP-3 to the SP-3A-1, the SP-3B with a superior power supply and circuit influenced by the then-new SP-6, and even a factory update in the 1990s to SP-3C.

To its credit, Audio Research never seems to abandon its older models. Indeed, Managing Director of Sales, Dave Gordon, said that, 'We can restore anything we ever made, including SP-1s, except for one version of the CD2 CD player.'

**'I would love to hear a mint SP-6 against a mint SP-6E'**

## ROLE OF TRANSISTORS

But then we hit a diversion. In the feature on Audio Research in the June 2009 issue, and in the review of the DSi200 solid-state amplifier in April 2010, the company's less-than-welcomed early forays into solid-state were discussed in some detail. Two of the culprits filled the gap between the SP-3 and its true descendant, the SP-6: the short-lived

SP-4 and SP-5 transistor models. But they are not mere detours, for they, too, played an important role in defining the SP-6 as a milestone.

It should be remembered that the SP-4 (1976) and the similar but simplified, lower-priced SP-5 (1977-1980) bore the layouts and faceplates that sired the format of every ARC preamp since: a single row of nicely-machined rotary controls between 'pro'-style handles, below them a recess full of toggle switches (in recent years, press buttons). Irrefutably, they introduced the look that has served the company so well. If you saw

either today, you'd know exactly who manufactured it.

## NEW DESIGN

As cited in the previous articles, ARC's founder William Z Johnson

recalled for *Stereophile* in 1994 that he created the SP-6 after having veered off into solid-state, with the blunt observation that, 'after fighting that [solid-state] for a couple of years, we finally decided we simply couldn't win the battle, and in 1978 I brought out the SP-6 pre, which was very, very successful.'

What he delivered was a new tube design with its roots in the classics, but with an electronically-regulated solid-state power supply, according to the catalogue, that

**BELOW:** Original brochure for the SB-6B, released in 1980; a major re-design, auto and low-line muting was added along with a more sophisticated power supply



## SP-6 SPECS

While close examination of every spec sheet reveals minor evolutionary gains – for example, the SP-6C's output impedance and phono stage specifications changed slightly over the SP-6B's, with most other specs being identical – the differences were audible enough to warrant reassessments in the press, and to inspire a flow of older units being returned to the factory for upgrades. But using the keystone model – the '6B – as typical of the breed, some key numbers from the factory were:

Frequency response: High level section:  $\pm 0.25$ dB, 10Hz-30kHz  
Magnetic phono:  $\pm 1$ dB of RIAA (30Hz to 15kHz)

Distortion (THD): Less than 0.03% at 5V output, IHF load, 20Hz to 20kHz (typically about 0.003% in midband)

Gain: Magnetic phono input to main output, 60dB

Input impedance: 50kohm, all inputs (magnetic phono may have any value from 10ohm to 100kohm substituted. Also has provision to add input capacitance for matching certain magnetic cartridges)

Output impedance: 500ohm at 1kHz, 2.1kohm at 20Hz, all outputs. Recommended minimum load, 20kohm

Dimensions: 480x134x260mm (whd); weight 22lbs / 10kg

Apparent from some mouse-jockeying is that this much-loved unit is – with no sense of irony whatsoever – still being subjected to modifications. We suggest that you start with the Audio Research Database page [www.arcdb.ws](http://www.arcdb.ws). More adventurous sites include: <http://kevin.kevino.org/tubes/sp6.shtml> and <http://sites.google.com/site/mpbarneyamps/audioresearchsp-3preamp>.

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# AUDIO MILESTONES

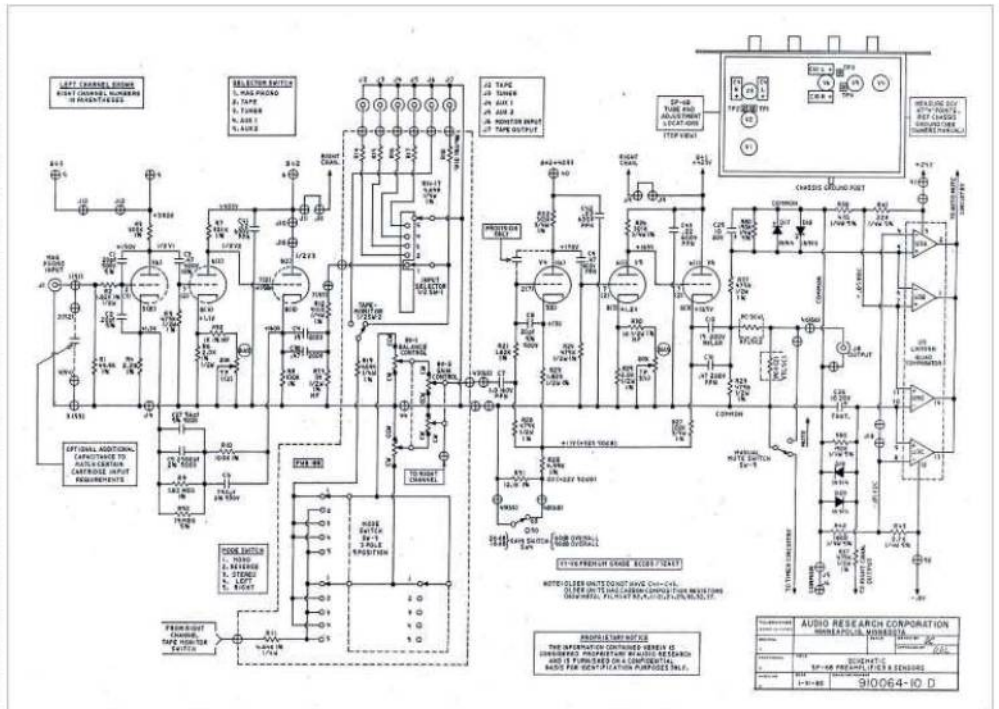
was 'capable of providing isolated and regulated voltages to each circuit section. This has been accomplished in the SP-6A by utilising an all solid-state triple section regulator with massive "filtering" and energy storage at the output of each section.' To this, the company attributed the ability to 'increase the bandwidth of an AC coupled vacuum tube design without compromising the all-important circuit stability.'

Remember: Audio Research suffered a bad bout of transistoritis, but still felt compelled to justify, almost apologetically it seemed, a preference for tubes.

And yet, William Z Johnson was only being true to the company's practice. As CEO Terry Dorn told *Hi-Fi News* last year, 'Bill was a big believer in big power supplies, well-regulated, because he knew those things worked in the modifications. That philosophy has continued right to the present day... there was a certain similarity among the SP-1, 2 and 3 series, and then later as you got into the SP-6 series, there was a whole new evolutionary change in the design of the front panel and the rear chassis.'

## IN THE NEWS

Those self-same modifications encapsulated the SP-6 experience; I would love to hear a mint SP-6 against a mint SP-6E to hear the differences, just to know how much they improved on the original. It was almost an obsession, Dorn admitting that the SP-6 went through the most



**ABOVE: SP-6B schematic, dated 16th May 1978. 'Premium grade' ECC83/12AX7 triodes were specified**

**BELOW: Original owner's manual and brochure for the SP6-B; beneath these is a spec sheet for the SP6-C from 1981**



revisions of any ARC preamp, but it wasn't cynical exercise: it was simply Bill's need to improve continually the existing models.

It certainly kept the SP-6 in the news, and made it controversial. As Dorn explained last year, 'it was exciting because every few months, there was a new modification that could be done. You'd send it in through your dealer, or directly to the factory, and you had the modification installed, and you'd get it back and, wow! – there's a new level of performance.'

Dorn explained the ups and downs of the modification

programme in the May 2009 issue of *Hi-Fi News*, summing it up with the observation that 'there was a general perception that we were a kind of "update-happy" company, that updates were a part of our philosophy and that probably we did too many of them.'

## PRESS DARLING

Despite this, how the press loved the SP-6, in all its incarnations. *The Absolute Sound* alone reviewed it or commented on it in detail in at least eight issues, with full-scale reviews of the '6, '6A, '6B, '6C and '6E, along with 'Further Thoughts' columns.

Its presence was almost insidious: legendary reviewer J Gordon Holt described the SP-6 in *Stereophile* in 1979, in the middle of a review for the rival Berning preamp, as 'generally acknowledged thus far to be the best preamp money can buy.'

In his closing paragraph, Holt went on to say that, 'whereas the SP-6 had all of the attributes of the very best tubed components, the Berning seemed to have all the attributes of the best tubed and solid-state components with none of the shortcomings of either.' Which – then as now – must have tickled those who worshipped the SP-6 precisely because it *didn't* sound like a transistor unit on any level. After all, its *raison d'être* was precisely that: not being solid-state.



**ABOVE: Literature that accompanied the release of the SP-6A in 1978; LV regulation was added for some tubes**



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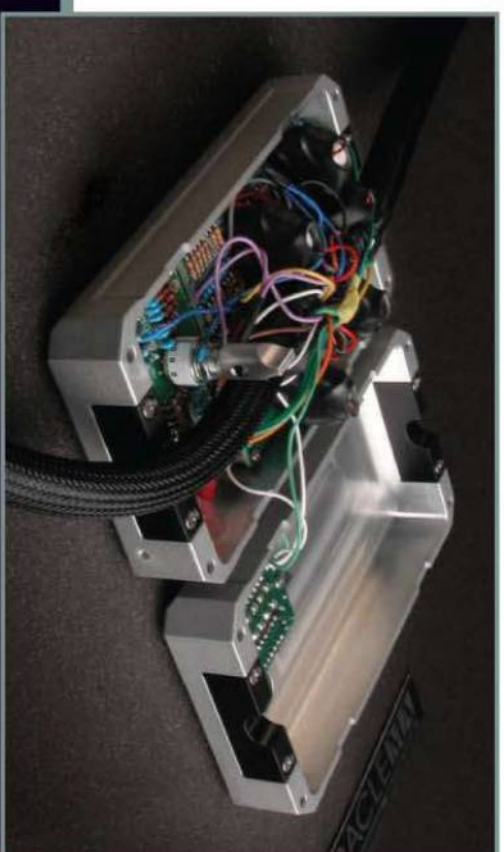
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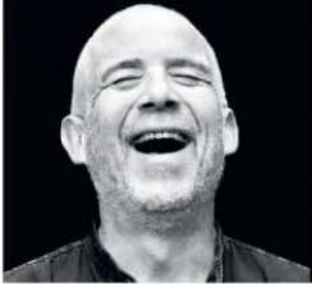
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*Alan Sircom Editor Hi-fi plus issue 69*

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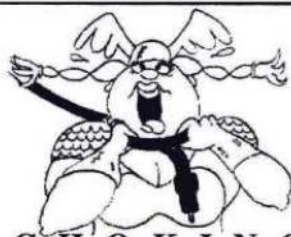
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# OFF THE LEASH!

KEN KESSLER TELLS IT LIKE IT IS...

**Ken Kessler** on high-end hi-fi, the gadget 'gurus', and why 'the best' isn't always good enough...



In the mid-1970s, before the Rise of the Yuppie and the explosion in the demand for high quality luxury goods, a small volume was published, entitled *The Best*. A mildly-amusing read, it purported to list whatever was, at the time, the finest offering in a wide number of categories.

While I cannot remember 'Best Wine', 'Best Shoe' nor 'Best Car', I painfully recall the 'best' audio components. In these days of unbridled litigation, it is not worth courting a lawsuit: suffice it to say, the standout products were what we would call – now and then – 'mid-fi' at best. It said more about the author of the book than the hardware, though, because no individual can be an expert in every field. Each category should have been addressed by a known authority.

## SIMPLY THE BEST?

Over the decades, this abuse of naming something 'the best' (and it can only ever be a subjective call, however well-informed) occurs repeatedly. All you need for a quick hit of venom is to pick up a copy of one of the monthly 'gadget mags' to see how they handle high-end audio. While they have equal respect for hand-held games, smartphones, netbooks and digicams, their idea of state-of-the-art sound quality is an iPod dock costing more than £99.

Worse is a world-famous 'luxury' magazine that allows its readers to choose the best of everything every year. Now you might think this is egalitarian, and as it should be, but how many readers, for example, drive as many cars in a year as Gavin Green or Tiff Needell? How many readers see as many films as Barry Norman? And, with all due respect, how many hi-fi enthusiasts have tried as many speakers this year as Keith Howard? Thus we had the most

influential luxury mag in the world declaring B&O, Bose and Sony as the best you can buy with unlimited funds.

Far be it for me to criticise those brands, each of which sells more product in an hour than

the Top 10 high-end brands combined do in a decade. And I consider Sony to be the honourable paradigm when it comes to the world's mega-brands.

So, if popularity is the yardstick, we can stop all criticism and reviewing right now, and shuffle off this mortal coil *knowing* that Dan Brown and J K Rowling are the greatest authors who ever lived and *I'm A Celebrity In The Jungle Cooking Dinner For Simon Cowell* is the finest TV show ever.

But we know that's not so. You do not have to study Ruskin or Arnold to appreciate that there may be abstract absolutes which attest to the intrinsic quality of an artwork, object, idea or mode of behaviour. Do you

need an explanation as to why a burger from London's Automat is better than a Big Mac? Don't get me wrong: a Mac Attack is something I suffer regularly, but I would never suggest it's a rival for a hand-formed patty of selected beef cooked to order. But back to audio.

What we depend on is called 'received knowledge', that societal and/or instinctive consensus which tells us that clean water is more potable than a puddle outside a pub at 2am on a Sunday morning. With hi-fi, any one of you is better qualified to write about high-end audio than *any* of the hacks assigned to this country's major newspapers to deal with 'gadgets'.

## THE CULPRIT...

Among the more cynical of you are those who – with total justification – know that the major culprit, especially in the mainstream press, is advertising. I know of incidents so breathlessly corrupt that they explain the antics of this government: not a few key advisors came from what was once called Fleet Street. Writers are told to name brands because this or that pen, car or watch is advertising in that issue.

Blessedly, this has never affected me in this magazine. Review products arrive on my doorstep from the editor, with no agenda. I have never been told what to photograph at a hi-fi show for any reason other than a product's newsworthiness.

So it is with much glee that I point out that rare moment of a mainstream writer calling it correctly. In a new book titled *Handmade* [ISBN 978-907976-10-98, see [www.tectum.be](http://www.tectum.be)], editor Gerben Bijpost and his contributors expound on the greatness of specific artisans who illustrate why 'hand-made' remains a code word that stands for excellence.

While I am not qualified to question the choice of pocket knife, Scotch nor grand piano, I was delighted to see that the only hi-fi brand held up as an exemplar of such excellence is Wilson Audio.

Whether or not you are a fan of Wilson is irrelevant. What you should celebrate is that, for once, the honour went to something worthy, and not a plastic piece of crud made in the hundreds of thousands. ☺

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# A LEGEND IS REBORN

WILSON  
AUDIO

## 'THE KING IS DEAD, LONG LIVE THE KING'

Alan Sircom – Editor, Hi-Fi+ (issue 67)

## 'A COMPELLING, EXHILARATING EXPERIENCE'

José Victor Henriques – Editor, Hi-Fi Clube (October 2009)

## 'THE PERFECT LOUDSPEAKER'

Floorstanding Loudspeaker of the Year – Hi-Fi+ Awards 2009 (issue 68)



There comes a moment in every product sphere when a truly iconic product is created. In the case of high-performance speakers, that product was the original Wilson Audio WATT/Puppy.

Now David A. Wilson has reengineered the speakers that defined audio excellence for a generation. The Sasha W/P boasts the same uncompromising approach to design as its illustrious predecessor but with newly devised innovations such as the resonance minimising material that has been specially created for the cabinets, a revised motor/magnet assembly to bring new dimensions to the bass and a redesigned crossover that dramatically increases midrange clarity.

The result is a loudspeaker with holographic imaging, free-breathing dynamics and unrestricted sonic detail. A speaker that takes sound onto a new and rarefied plane. A speaker for people who don't know the meaning of ordinary.

The new Sasha W/P joins Wilson Audio's other extraordinary designs, including the Duette – probably the best 'bookshelf' speaker in the world – the compact floorstanding Sophia 2, the imposing MAXX 3 and the peerless Alexandria 2. Speakers without compromise, brought to you by Absolute Sounds: premier importer of the world's finest hi-fi.

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